MAY 7 1943

Gas Journal

LIGHT - HEAT - POWER - BY-PRODUCTS

. 241. 95th Year. LONDON, MARCH 31, 1943. Registered as a Newspaper. No. 4167. Price 1/-

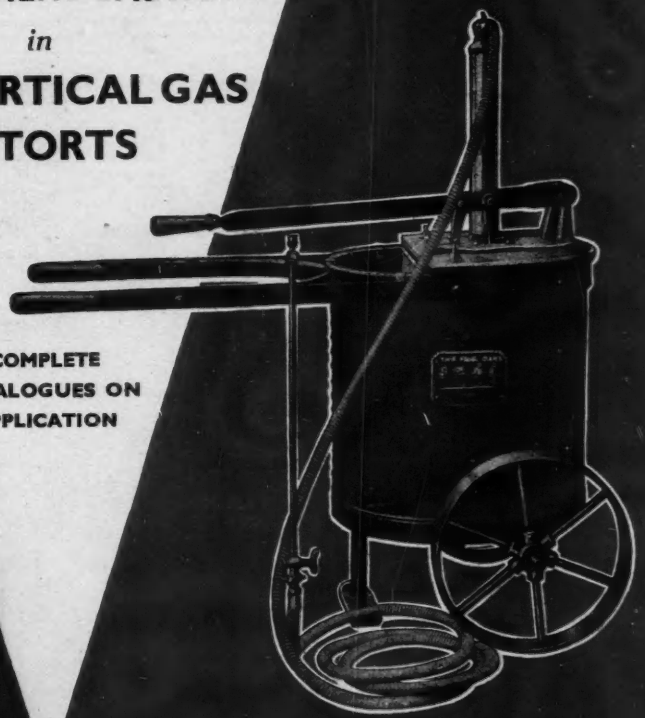
FOUR OAKS SPRAYERS

for

LIMEWASHING AND LIQUID CEMENT SPRAYING

in

HOT VERTICAL GAS RETORTS



REGISTERED TRADE MARK
THE FOUR OAKS.

COMPLETE CATALOGUES ON APPLICATION

The "FOUR OAKS" Gold Medal "Bridgwater" Pattern

The special feature of this pump is that the pump bucket works entirely outside the liquid.

18 Gallons, £20 2 6

Other patterns of smaller capacity and lower prices.

Above price plus 10% advance

THE 'FOUR OAKS' SPRAYING MACHINE CO.

FOUR OAKS WORKS, FOUR OAKS, BIRMINGHAM

TELEGRAPHIC ADDRESS:- SPRAYERS, FOUR OAKS. TELEPHONE:- No. 305, FOUR OAKS

Peebles

GAS GOVERNORS

PRESSURE LOADED STATION GOVERNOR

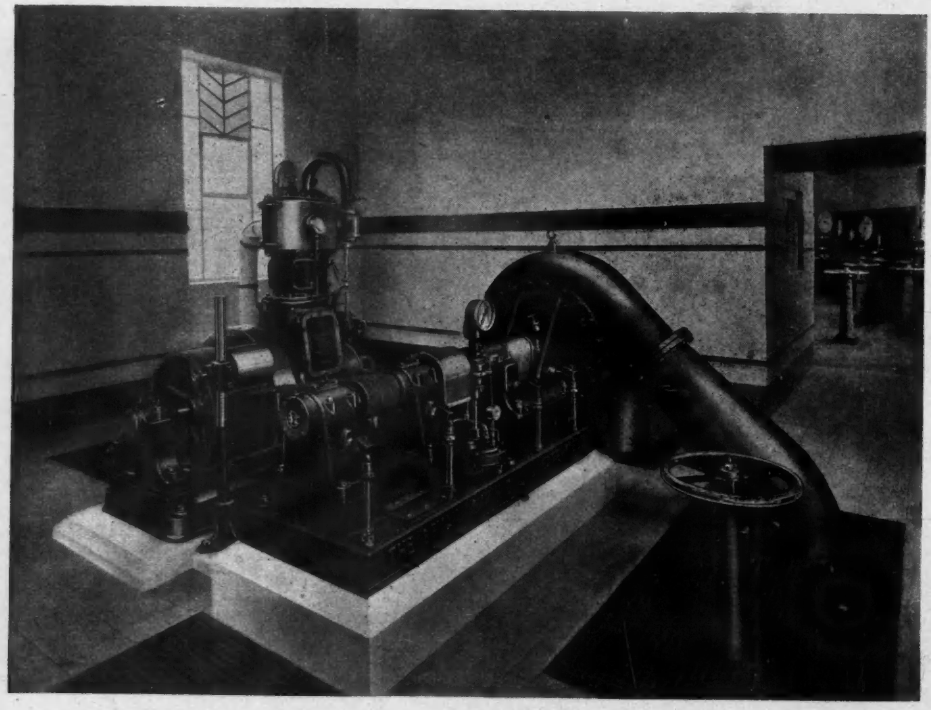
Many of the major innovations—such as Remote Control of Gas Governors, Clock Loading, Automatic Safety Relief Valves for Retort Houses and Coke Ovens, and other developments which have contributed to the present high standard of equipment used in the Gas Industry—originated in our Tay Works.

Here, for over 70 years, we have been producing the most successful Gas Governors in the world.

We shall value your enquiries for Station, District, Retort, H.P., Service, Safety Cut-off valves, and all other types of Gas Governors. We manufacture all sizes.

PEEBLES & COMPANY, LTD.
TAY WORKS, BONNINGTON, EDINBURCH
'Phone: Leith 36544 'Grams: Tangent, Edinburgh

E.I.H.



Rateau Turbo Gas Boosters and Exhausters

....

Fig. 907.—Rateau Turbo Booster driven by a Vertical High Speed Steam Engine through "V" Ropes.

THE BRYAN DONKIN COMPANY, LTD.

Gas Works Plant Engineers, CHESTERFIELD

MEMBERS OF THE SOCIETY OF BRITISH GAS INDUSTRIES

CONTENTS

EDITORIAL NOTES

What Do We Need? . . . 399
Balance of Power and Fuel . . 399
Satisfaction without Complacency . 400
Smoke Abatement Society . . . 400

Personal 401
Southern Association 401

Letter to the Editor 401
Gas Characteristics 402
Views of an Architect . . . 402
Cooker Construction 402
Southern Association of Gas Engineers and Managers: Presidential Address, by Lt.-Col. F. J. Bywater, M.C., M.Inst.C.E. 405

Radiation Limited 411
Tottenham and District Gas Company 413
Scottish Gas Development Centre . 413

Gas Products Prices 414
Gas Stocks and Shares . . . 414

THIS WEEK'S ADVERTISERS

	PAGE
Alder & Mackay, Ltd.	S2
Allen, Alfred, & Son, Ltd.	S2
Bale & Church, Ltd.	S4
Balfour, Henry, & Co., Ltd.	S2
Blakeley, Firth, Sons & Co., Ltd.	S4
British Furnaces, Ltd.	388
British Vacuum Cleaner & Engineering Co., Ltd.	395
Broom & Wade, Ltd.	Cover IV
Brotherhood, Peter, Ltd.	397
Bugden, Thos., & Co.	S3
Clayton Son & Co., Ltd.	388
Clough (Croydon), Ltd.	Cover IV
Cowan, W. & B.	Cover III
Cox & Danks, Ltd.	S3
Dempster, R. & J., Ltd.	385
Dempster, Robert, & Sons, Ltd.	404, S4
Dick, R. & J., Ltd.	390
Donkin Co., Ltd. (The Bryan)	Cover II
Foster Transformers & Switchgear, Ltd.	389
"Four Oaks" Spraying Machine Co.	Cover I
Gas Meter Co., Ltd.	Cover IV
Gas Purification and Chemical Co., Ltd.	S4
Glover, Thos., & Co., Ltd.	398
Grant & West, Ltd.	S4
Griffin & Tatlock, Ltd.	390
Harrisons (London), Ltd.	S4
Holmes, W. C., & Co., Ltd.	S5
Humphreys & Glasgow, Ltd.	396
Jeavons, E. E., & Co., Ltd.	391
Keith Blackman, Ltd.	S6
Kirkham, Hulett & Chandler, Ltd.	393
Londex, Ltd.	S3
Main, R. & A., Ltd.	410
Menno Compressed Air Greasecup Co., Ltd.	S3
Mewburn, Ellis & Co.	S4
Parkinson Stove Co., Ltd.	412
Parkinson, W., & Co.	398
Peckett & Sons, Ltd.	414
Peebles & Co., Ltd.	Cover II
Radiation, Ltd.	408, 409
Reavell & Co., Ltd.	S6
Reinforced Concrete Association, Ltd.	407
Rotherham & Sons, Ltd.	386
Russell, R., & Sons, Ltd.	S6
Spencer-Bonecourt, Ltd.	386
Strachan & Henshaw, Ltd.	S4
Trotter, Haines & Corbett, Ltd.	S4
Walker, Crosweller & Co., Ltd.	392
Walker, C. & W., Ltd.	392
Walker, James, & Co., Ltd.	394
Wellington Tube Works, Ltd.	Cover IV
West's Gas Improvement Co., Ltd.	S1
Whessoe Foundry & Engineering Co., Ltd.	387
Wilkes, A. H., & Co.	S3
Willey & Co., Ltd.	394
Woodall-Duckham Co.	403
Wright, Alex., & Co., Ltd.	395
Trade Cards	414
Appointments Vacant	S4
Miscellaneous	S4
Patents	S4
Plant, &c.	S4
Plant, &c., For Sale and Wanted	S4

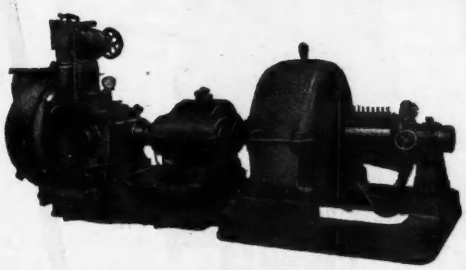
The "Journal" and "Salesman" office is at 51, High Street, Esher, Surrey

Communications addressed to Bolt Court have to be forwarded, and this causes delay

BROTHERHOOD
STEAM TURBINES FOR GASWORKS

Our Turbines, made for all powers up to 15,000 B.H.P. and for all conditions of service, are installed for driving Exhausters, Boosters, and Generators in many Gas Works, including:—

The Gas Light & Coke Co., South Suburban Gas Co., Wandsworth & District Gas Co., and in Works of Corporations and Companies at—Birmingham, Bristol, Coventry, Cardiff, Exeter, Liverpool, Manchester, Newcastle-on-Tyne, Preston, Portsmouth, Sheffield, Smethwick, Toronto, etc.



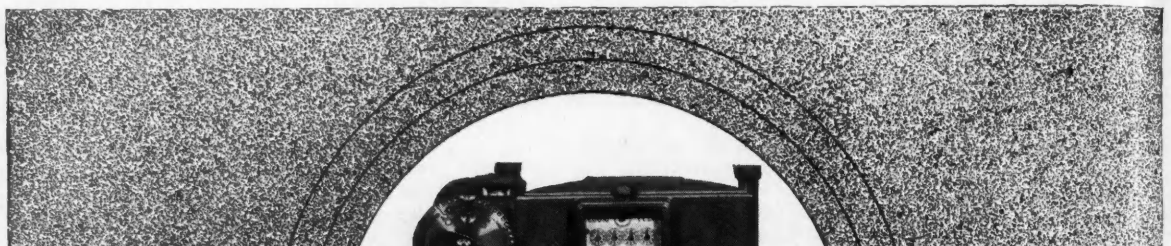
300 kW Back Pressure Geared Turbo-Generator.

Exhauster driven by 150 B.H.P. Steam Turbine at 13,000 r.p.m.

Brotherhood plant for Gas Works also includes Reciprocating Boosters, Water Cooling Towers, Air and Gas Compressors for all pressures and capacities.

PETER BROTHERHOOD LTD

PETERBOROUGH :: **Branch Offices in LONDON, LEEDS, MANCHESTER and GLASGOW**



THOMAS GLOVER & CO. LTD.

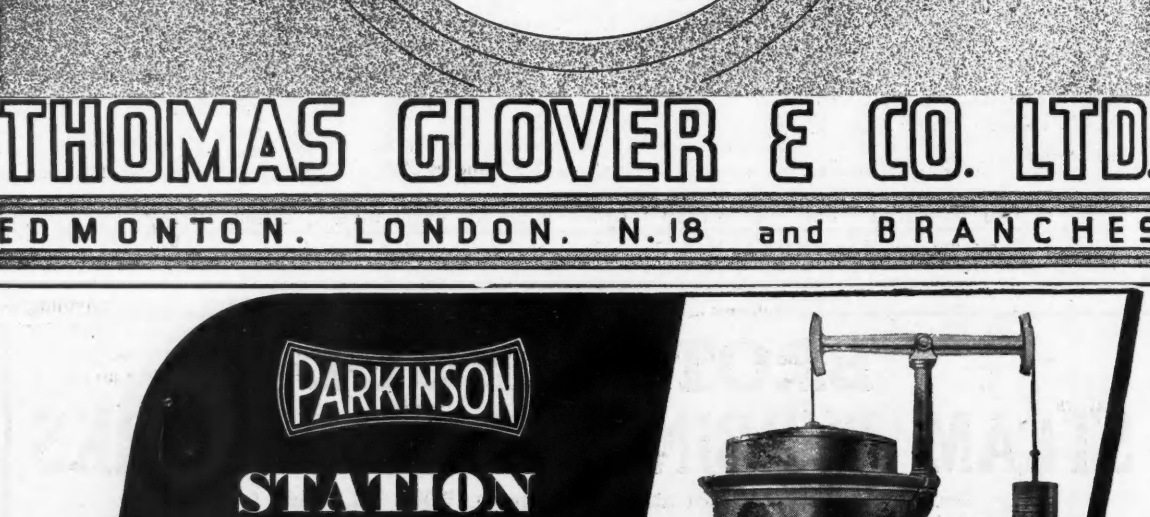
EDMONTON. LONDON. N.18 and BRANCHES

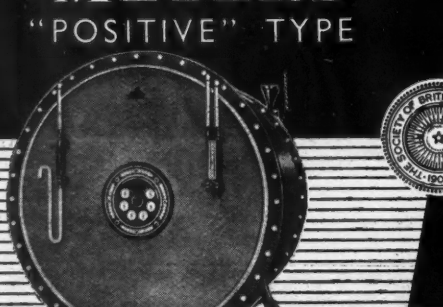
PARKINSON

STATION GOVERNORS

STATION METERS

"POSITIVE" TYPE





W. PARKINSON & CO.

(Incorporated in Parkinson & Cowan (Gas Meters) Ltd.)

COTTAGE LANE WORKS,
CITY ROAD, LONDON, E.C.1

Also at

BIRMINGHAM AND BELFAST

P.6

GAS JOURNAL, MAR. 31, 1943

VOL. 241 95th YEAR No. 4167

EDITORIAL NOTES

WHAT DO WE NEED?

"AND please keep on about it" is the tailpiece to one of many letters which have reached us on the subject of recent editorials in the "JOURNAL." We confess that, out of their context, these words sound like an incitement to the type of agitation which it has always been our editorial policy to leave to others. But the signature to the letter, if we could disclose it, would make it clear to the whole Industry that the words quoted are only typical of a generally expressed desire for more open discussion of matters which for too long have been the subject of mutterings in holes and corners. There is a large measure of agreement that to bring them into the open is not likely to widen any dissension which exists within our ranks, but rather to point the way to healing it. We certainly have no notion of accepting the role, jestingly assigned to us in a luncheon speech at last week's Southern Association meeting, of keeping the ring for a London *versus* the Rest contest.

Even if it were our intention to engineer an agitation on behalf of any section of the Industry against any other section or parties, it would in truth be difficult to know where to begin, or whither it would lead. The expressions of opinion which we have received since we asked, a fortnight ago, "Where do we stand?" have revealed such a complication of cross-currents that we should very rapidly be lost in the maelstrom. As one of the letters published last week points out, reforms are urgently needed in the districts as well as nationally, and whereas two parties may well agree in objecting to the alleged "London" control, it is by no means certain that they see eye to eye on other matters. Again, other correspondents on this question of influence, if not control, point out that the big London companies have contributed greatly to the Industry, and, if suspicion has been caused, it is frequently by their officers being placed in positions of importance. But what other undertakings, it is asked, could release and loan men of sufficient calibre to undertake whole time work in the general interest? This aspect of the matter is freely conceded, and our correspondence shows that there is no unanimous agreement even as to whether London influences should or should not be paramount, or whether in effect they are. But it is generally agreed that feeling on the subject is widespread, and a hindrance to the unanimity which is so essential to progress. The view is widely held that, outside the Institution, elections to the national bodies are insufficiently democratic to ensure free discussion on all matters, and that the tendency is for policies to be shaped, without prior consultation, for the many by the few. The many agree that before final ratification they are asked to say "yea or nay," but, if they say "nay," then there is no policy at all. If, on the other hand, they hold up their hands, which is perhaps unwise unless they are in full agreement, they have the impression that they are subscribing to a scheme of things which has been designed for them by others who do not really understand their particular problems.

Not being admitted into the inner workings of Gas Industry House politics, we confess that we are stating, not facts from our own knowledge, but the views of those who complain that they have too little opportunity of influencing the destiny of the Gas Industry. And in fairness we reiterate that such views are not held universally even in the Provinces. In some measure we must attribute the present muddle to lack of interest on the part of the ownership of gas supply, whether private or municipal. Such interest rarely extends beyond the purely local and, though the gas engineer upon whom the onus generally ultimately rests no doubt does his best to represent the interests of his employers in the wider national sense, he may not necessarily be the best hand at "playing politics." At the same time, there is no lack of informed opinion among the gas undertakings' personnel of the country, both senior and junior, which is anxious to make itself heard and is capable of contributing richly to the future development of the Industry. Means must be found to this end if, as is claimed, they do not already exist.

Practically all the letters which have reached us on these matters have two common denominators. "Whatever you may say about London control, preserve us from control by the 'wild men,'" is a very general plea. This cryptic description, the meaning of which we are evidently expected to understand, we pass without comment. The other thought expressed by all, to whatever particular shade of opinion on other matters they adhere, is regret at the resignation of Dr. E. W. Smith. Quite apart from his representation of Gas Industry thought in the outside, and especially the official, world, it is quite clear that he was regarded as the focal point for the beginnings of agreement within the Industry. Particularly did the Provinces look to him to obtain such co-operation in the country as would make them more coherent in presenting an agreed point of view. For, make no mistake, they do not flatter themselves in the slightest that they are able at present to show anything like a common front. This function for which a very large part of the Industry was looking to Dr. Smith should, of course, have been performed by the national bodies providing an agreed and accepted leadership. With the inability, however, of so large a section to have complete faith in the bodies as now constituted, great hopes were vested in Dr. Smith's campaign for national unity as the basis of reform. It remains to be seen whether negotiations which are now proceeding for a reconstitution of Gas Industry House machinery will produce an acceptable result. If they do not, we shall remain adrift until some other solution is found. Our great Industry certainly cannot be allowed to suffer shipwreck. But we have been warned; the time for drifting without foundering is strictly limited.

BALANCE OF POWER AND FUEL

THE plans of the London and Counties Joint Electricity Authority were outlined in the "JOURNAL" of March 10 (p. 306), and they were allotted considerable "spread" in the national Press—much, we discover, to the annoyance of other electricity "authorities." At the general meeting of the County of London Electric Supply Company last week the Chairman, Sir Robert Renwick, had something to say about the J.E.A., who, he remarked, "run a very medium-sized undertaking and who appear anxious to rush into print with a political scheme for reorganizing the industry." The impropriety of such pretensions did not appeal to him, particularly as the Minister of Fuel and Power has asked the industry as a whole to submit the industry's views on the post-war position. Sir Robert added that he saw no reason why the electricity industry should not be able to meet the altered conditions of the post-war period in a united way without "the dislocation envisaged by political planners." In his view, the electricity industry does not want

a major operation, though it may need some first aid. He deplored the amount of effort and scheming which "a number of gentlemen appear to find time for in advancing views about post-war planning, usually flavoured with a political bias."

On the same day the Chairman of the Metropolitan Electric Supply Company talked of the pretensions of the J.E.A., whose scheme "has received a degree of attention out of all proportion to the importance of that body, consisting of members the great majority of whom show strong political bias." His opinion was that the J.E.A. scheme merely proposed to perpetuate the worst features of bureaucratic control. After washing in public considerable quantities of the J.E.A. linen, Major Richardson suggested that nobody ought to be unduly impressed by the document published by the Authority concerned, though, in the next breath, he assured the stockholders of the Metropolitan Electric Supply Company that the directors were giving all such post-war matters the closest attention. We have spoken much of the need for unity in the Gas Industry; it would seem that cohesion may well be the motto but not the practice in the electricity industry, many responsible members of which appear to be querying what improvements in the interests of the public can possibly fructify from any schemes or plans which have the object of placing a "progressive service" under the serious restrictions and limitations inseparable from bureaucratic control of industry. And what about municipal control? Less talk on theoretical plane, more knowledge of fact—this, presumably was the theme of Major Richardson's comment, thus, on the matter: "The claims which are made to the effect that consumers would obtain cheaper electricity under public control are not confirmed by the results of comparisons between public control and company control of undertakings when supplying approximately equal areas having similar ratios of town, urban, and rural densities of population." Let us be free from "the misconceptions upon which uninformed but enthusiastic critics are inclined to base their unrestrained advocacy of public control." A vigorously worded statement, and maybe a healthy reminder that we should exercise a little common sense even in wartime when both men and women, doubtless highly-motivated, are, through sheer ignorance of facts, planning the new world before the war is won. What, however, interests us most concerning the extracts we have given from the speeches of electricity chairmen is that all does not appear to be lovely in the garden of electricity.

But we headed this note the "Balance of Power and Fuel," for we discern among electricity post-war planners—or some of them, at any rate—a desire to co-operate with raw coal rather than with gas. We think we can understand the reason for this—the present practical impossibility of storing electrical energy. We suggest—and we write during a period of "truce" or "understanding" between the gas and electricity industries, at the end of the beginning of war—that the electricity industry is frightened about its lack of storage facilities and, with wish father to the thought, is cunningly and also openly wooing raw coal. Argument about the balance of fuel and power, or, as we see it at present, "balance of power and fuel," runs in some electricity circles somewhat thus (after the usual preliminary canter on the need for co-operation between electricity, gas, and coal, of course): House coal commands pit head prices some 4s. per ton higher than the price paid for gas and electricity coal. This is equivalent to over £9,000,000 a year. Hence any disturbance of any considerable proportion of the house coal trade by gas or electricity must throw a hefty spanner into the economic wheels of the coal industry. It might mean dearer gas and dearer electricity. Moreover the open coal fire is a prejudice to which every Britisher is entitled. And so on, with the accompaniment of "Here, here," and "You've said it," culminating in the essence of the argument that raw coal is indispensable to the electricity industry—*i.e.*, raw coal in the open fire grate.

Thus, to the brave new world, to the era of scientific coal treatment, to the time of clean atmosphere. The Gas Industry simply must put its case—even in wartime. It must put its case to the nation for the benefit of the nation. It will be dismal if its case falls on deaf and ignorant political ears.

SATISFACTION WITHOUT COMPLACENCY

THE results of the year's working of Radiation Limited as outlined by the Chairman, Mr. J. F. Davies, at the annual meeting (see p. 411) are highly satisfactory amid the present confused conditions of war, and should inspire confidence—if indeed any such confidence be needed—in the firm's capacity and ability to weather successfully any immediate difficulties which may present themselves, and to emerge when peace eventuates in a strong position to cope with the further problems and grasp the great opportunities for expansion which will, we think, inevitably show themselves. After three and a half years of war the firm's solid foundation remains unshaken, and its services during this troubled period have enhanced the reputation it won by merit and much research in the pre-war years. As Mr. Davies said, there exists to-day throughout the nation the hope that in the years following this war the general standard of living, of amenity, and of comfort may in many directions be raised; and in furthering the fulfilment of this hope we think that the makers of gas appliances will have a great part to play and will certainly pull their full weight. It is good to learn from the Chairman's speech, for example, that in the post-war period Radiation will have available appliances which will more than maintain the high standards reached at the outbreak of war; and we share the hope Mr. Davies expressed that, despite the urgent and pressing needs of the day, it may be found possible to make available the small amount of labour needed for the important work of preparation for the future. The tone of quiet confidence—entirely unallied with complacency—which characterizes the speech is most heartening. It augurs well for the expansion both of Radiation Limited and of the Industry it serves and of which it is part and parcel.

Smoke Abatement Society

The annual report for 1943 of the National Smoke Abatement Society makes very encouraging reading. The danger of becoming moribund which threatened the Society during the first years of the war now seems finally to have been removed, and during the year there has been a continued strengthening of its position, both as regards membership and funds, and even more, in regard to activity and influence. Whatever the immediate outcome of its endeavours there seems no doubt that the situation created by the war, together with the clarification of the problem and emergence of more concrete policies than has previously been possible, are bringing the Society into a far more favourable position for making decisive demands and for undertaking a more determined and effective campaign for the final ending of the smoke nuisance.

The Annual Meeting of the Wales and Monmouthshire Association of Gas Engineers and Managers will be held at the Park Hotel, Cardiff, on May 27, under the Presidency of Mr. A. E. Pask. An Address will be given by Mr. E. V. Evans, President of The Institution of Gas Engineers.

The Regional Licensing Officer of the Ministry of Works has moved to Government Buildings, Clifton Boulevard, Nottingham. His telephone number is Nottingham 77733. All queries regarding Civil Building in Region 3 should be made to this address.

"JOURNAL" VOLUMES

While present restrictions on the size of our weekly issues continue, we propose to discontinue the practice of dividing a year's issues into four volumes, and adopt instead a six-monthly division. The present volume—No. 241—will therefore be continued up to the end of June, and the next index published will cover this period instead of Jan.-March as heretofore. It is felt that this system will effect economy both of material and of cost to the many who customarily bind their "JOURNALS" for record purposes, and that it will provide volumes of more reasonable size for the bookshelf.

Personal

MR. J. A. DRAKE.

Mr. JOHN ARMITAGE DRAKE has been recently elected Chairman of the Board of Directors of Messrs. Drakes, Ltd., of Halifax. Mr. Drake is the great grandson of Mr. Jonas Drake, who founded the firm in 1847. Following in the direct line of succession, he inherits a tradition of service and thoroughness which has won esteem for the firm, which in 1947 will celebrate its centenary.

* * *

Mr. EDWARD J. K. FUSSELL, F.C.I.S., has been appointed an additional Director of the Tottenham and District Gas Company. He retains his present position of Secretary and Accountant to the Company.

* * *

Pilot Officer GATES, who was recently awarded the D.S.O., was employed by the Wandsworth & District Gas Company before the war. His father, Mr. Frederick C. Gates, was District Superintendent of the former Sutton Gas Company, and continued in the service of the Wandsworth Company following the absorption of the first-named. Pilot Officer Gates has another link with the Gas Industry, for an uncle, Mr. Horace Gates, is the Chief Clerk of the Maidstone Gas Company.

Southern Association

The Annual General Meeting of the Southern Association of Gas Engineers and Managers was held at Grosvenor House, Park Lane, London, on March 26, the President, Lt.-Col. F. J. Bywater, M.C., M.Inst.C.E. (South Metropolitan Gas Company), in the chair.

The minutes of the last Annual General Meeting, as published in the "GAS JOURNAL," were taken as read had confirmed. The President announced that the statement of accounts had been accepted by the General Committee and could be inspected by any member who wished to do so.

Mr. S. E. WHITEHEAD (Southampton) proposed, and Mr. W. H. WISE (Sherborne) seconded, the election of Mr. R. C. Taylor (Torquay) as Vice-President of the Association.

Mr. TAYLOR, having been unanimously elected, said he regarded the honour as a tribute to the West, and with the toleration of the members and the guidance of Mr. Howie as Secretary he would do his best.

Mr. W. A. HOWIE was re-elected Hon. Secretary and Treasurer, and Mr. J. M. DONALDSON and Mr. J. URQUHART were re-elected Hon. Auditors. Mr. Howie was also reappointed to represent the Association on the Council of The Institution of Gas Engineers. The meeting confirmed the following appointments to the General Committee: Eastern District, Mr. H. J. Escreet, Mr. J. H. Hornby, and Mr. L. J. Humphrys; Western District, Mr. H. W. Versey and Mr. Noel S. Smith.

Election of Members

On the proposition of Mr. D. C. CROSS (Lea Bridge) the following were elected members of the Association:

Mr. J. V. Britnell, Uxbridge.	Mr. A. Wells, Herne Bay.
Mr. W. W. Chisholm, High Wycombe.	Mr. W. J. Baker, Weston-super-Mare.
Mr. A. E. Haffner, Nine Elms.	Mr. E. H. Hart, South Molton.
Dr. S. Pexton, Holland Park.	Mr. S. B. Jones, Minehead.
Mr. W. G. Phillips, Luton.	Mr. T. Rudd, Chard.
Mr. T. S. Ricketts, Hertford.	Mr. H. C. Springer, Kingsbridge.
Mr. F. G. Symon, Reading.	
Mr. R. Woodward, Newhaven.	Mr. A. L. Thomas, Portland.
Mr. F. B. Waller, Stroud.	Mr. H. Newcombe, Ivybridge.

Presentation to Mr. G. Le B. Diamond

The PRESIDENT said that, as the members knew, it had been customary for the Association to ask its ex-President to accept a small piece of silver as a memento of his year of office and an expression of gratitude for the work he had done. Owing to limitation of supply the silver was not available on this occasion, but he would ask Mr. Diamond to accept a token presentation in the hope that he would have the real thing at some future time. They had not seen as much of the life of the Association during Mr. Diamond's term of office as they would have wished, but that was not his fault; it was the fault of the times in which they found themselves. Members had felt no doubt as he had, that Mr. Diamond's hand on the tiller had been steady and very true. They had been fortunate in maintaining the traditions of the Association under his leadership during the past year, and they were grateful to him for all he had done. They wished him very good luck in his very busy life, and hoped that when his memento came to him it would remind him of many happy days in the old Association.

Mr. DIAMOND, in response, said that whatever measure of success had attended his year of office was very largely due to Mr. Howie. Without his help as Secretary even the things that were done could not have been done.

The President's Address

The PRESIDENT then delivered his Presidential Address, a report of which will be found on p. 405.

Mr. J. M. WEBBER (Croydon) proposed and Mr. W. H. WISE seconded a vote of thanks to the President for his Address.

The PRESIDENT said it had been a great pleasure to prepare the Address. He was very keen about the young people, and he commended the latter part of the Address particularly to the attention of the members. It was a subject about which he had been very concerned for the last twenty years.

The Beveridge Report

Mr. HENRY LESSER, O.B.E., LL.B. (South Metropolitan), then read a Paper on "The Beveridge Report, with Special Reference to Pension Funds and Workmen's Compensation," a report of which will appear in later issues.

The PRESIDENT, in introducing Mr. Lesser, said there was so much that was of value in the Paper that it was proposed to have it printed so that copies would be available for members of the Association.

After the Paper had been presented, the President announced that it would be discussed at a meeting of the Western District in May and at a meeting of the Eastern District in June.

Mr. E. V. EVANS, President of The Institution of Gas Engineers, proposed a vote of thanks to Mr. Lesser.

The PRESIDENT said it had been a matter for regret that they had not had the pleasure of hearing an Address from Mr. Evans during his Presidency of the Institution, but he had asked him to carry over from his Institution year a promise to address a meeting of the Association in the autumn. He had kindly intimated that he would do so, and the members would look forward to that meeting with keen interest.

Letter to the Editor

DEAR SIR,—I was very interested to read your Editorial entitled "Where do we Stand?" in your issue of March 17. Your comments raise questions of which many people have been thinking seriously, but on which few have had the courage to express a considered opinion.

Although a provincial, I feel that the ill effects of "London" control are very exaggerated. There are few problems affecting the Gas Industry which are capable of other than national solution, and, in the decisions on such cases, "London" has a right to expect a very considerable voice. Before the war the "London" Companies made 95,000 million cu.ft. out of a total output of 356,000 million cu.ft. The undertakings in the area of the Midland Association, for instance, made 47,000 million cu.ft. When the output of the undertakings controlled by Holding Companies is included, of which at least the financial control is again "London," the total subject to such control must represent approaching half the total output.

Again, the Industry has to thank "London" for very much of the research work, in the past, which has brought it to its present standard of efficiency. You may remember Dr. Smith telling us, at a Midland meeting, about Sir David Milne-Watson's remark that, whereas previously he had thought anything which was good for the Gas Light & Coke Company was good for the Gas Industry, now his feeling was that anything which was good for the Gas Industry must be good for the Gas Light & Coke Company.

In my opinion, our trouble is not "London" control, but lack of national control and direction, through there having been no fully representative live body capable of preparing a plan for the Industry. Representatives of all undertakings have to-day received, from the Joint Secretaries of the B.G.F., a circular letter announcing the appointment of a Sub-Committee of the P.W.P. Committee "to make a comprehensive survey of the Industry, designed to provide material upon which a scheme of reorganization can be based." We are told also that the Minister of Fuel and Power has, in effect, given the Industry six months' notice to prepare and submit proposals for the future, failing which the Ministry would undertake this task. In view of this decision, I suggest that this is not the time for discussion, but for action.

As citizens we may be given a "beveridge" which will cure all our ills from the cradle to the grave. As a Gas Industry we need a "tonic" to buck us up from the coal mine to the Sunday dinner, and whether we flavour it with "London" or "Plymouth" is of secondary importance.

Yours faithfully,

March 22, 1943. "PROVINCIAL."

Gas Characteristics

The following is a report of the discussion of the Paper by A. J. Leather, of Blackburn, to the Manchester and District Junior Gas Association on Feb. 27—see "JOURNAL" of March 10, p. 312.

The **President** (Mr. J. Graham), opening the discussion, said it was obvious that much time had been spent on the preparation of the Paper and the data it contained.

Mr. **H. P. Lupton** (Liverpool) was surprised to find that Mr. Leather suggested that maximum flame temperature was obtained when less air was used than was normally required. A statement in the Paper appeared to indicate that many difficulties had been experienced in burning gas, presumably in equipment supplied by the manufacturers. Liverpool had been supplied with equipment from makers all over the country. Only one factor appeared to be affected—namely, the satisfactory combustion of the gas at the burner, and that depended upon pressure. It was surprising to find no mention of the influence of pressure at the burner. Whenever there was a complaint respecting the functioning of an appliance, it was invariably a case of the pressure being too high or too low. A pressure of 3 in. gave satisfactory results. With regard to the comparison of a high-pressure burner or an air-blast burner by the behaviour of a bunsen burner, he wished to point out that the flame of an air-blast burner had entirely different characteristics from the flame of a bunsen burner. Consequently the operation of a bunsen burner could not be regarded as a criterion of the operation of an air-blast burner.

Mr. **Leather,** in reply, said he could not add to his comments about the highest temperature being attained with less air than the theoretical quantity, since he had accepted it as a statement of fact. There was no mention of pressure in the Paper, but he would be the first to emphasize its importance for the satisfactory operation of gas apparatus. There appeared to be some misunderstanding regarding the comparison between the bunsen burner and the air-blast burner. He had attempted to point out in the Paper that the method of burning in a bunsen burner was not a criterion for an air-blast burner.

Mr. **H. C. Applebee** (Manchester) confirmed the statement that some authorities considered that maximum temperature was attained when the quantity of air used was less than that required for complete combustion. There were, however, very few cases where it would be a practical proposition to burn the gas with less than the theoretical quantity of air, since there would be unburned products of combustion. Theoretically the statement made by Mr. Leather might be true, but in practice it would be an advantage to make a calculation of the quantity of air required for complete combustion. He did not understand the advantage of the weight basis, especially when the Gas Industry was being urged to maintain constant both calorific value and specific gravity. A suggestion had been made that one criterion which might be adopted was the ratio between the sum of the unsaturated hydrocarbons and the methane, divided by the sum of the hydrogen and carbon monoxide. As would be expected, if the variation was very little there would be little change in combustion characteristics. The Wobbe index was also suggested. The calculation could easily be made, but the difficulty was to find an answer to the question as to whether a particular gas would be suitable for a particular purpose. It would appear that some research should be done to determine what limits could safely be used.

Mr. **B. Woodhead** (Birkenhead) remarked that he observed that any variation to the retorts did not seem to increase the CO_2 content of the gas, but the hydrogen content was reduced. Consequently, it would appear that hydrogen was the first constituent which was combustible in the air infiltrating into the gas. On one occasion he required to use viscosity for a calculation, and he thought it could be obtained by ascertaining the viscosity of the constituents and taking them in proportion. To his surprise he found that the viscosity of the mixture was, in one or two cases, higher than that of the constituents. A works which produced gas of a constant weight per therm would have to sell on a weight basis or, alternatively, have the specific gravity controlled and continue to sell on a calorific basis. Was the suggestion of pounds per therm merely put forward for the use of manufacturers of appliances as an average or a maximum/minimum for a particular undertaking?

Mr. **Leather** said that in the calculation of viscosity it was recognized that it was not an additive property. Mr. Coe had recently read a Paper on kinematic viscosity in which he stated that it was the only factor which varied, and that all the others were constant. Mr. Leather was not prepared to say how far the application of pounds per therm should go. It might develop into a unit based on B.Th.U. per lb. rather than a volumetric basis, and meters might register such units instead of cubic feet.

Mr. **R. Norgate** (Newton-le-Willows) stated that he had carried out experiments in respect to flame temperature, and he found that the control of secondary air was most important.

Mr. **R. S. Cureton** (Northwich) referred to the case cited in the Paper where difficulty was experienced with a furnace. Surely it was not a question of calorific value but of specific gravity. If the specific gravity was not suitable for a particular appliance, then the flow of gas and air was naturally upset with the bunsen type of burner. The Author had also dealt with the effect of benzole stripping. Apparently Mr. Leather had dealt with the question only as it affected vertical retorts; with horizontals, when there was stripping for benzole a better quality of gas was made in practice. Consequently less diluent was required and specific gravities would be altered considerably.

Mr. **Leather** said he did not wish to suggest that the question was only one of calorific value. The figures that had been given involved both calorific value and specific gravity, whereas the usual method of assessing the burner was calorific value and the square root of specific gravity.

Mr. **E. B. Fields** (Blackburn) referred to the absence of the question of pressure from the Paper. In one of the largest works in Blackburn there was a pressure governor to each building, and each machine had its own governor. The required pressure was 4 in., but difficulties were constantly recurring. Attempts to alter the injectors failed, and it was not until Mr. Leather suggested a mixing plant that the trouble was overcome. This was definitely a case where pressure would not put the matter right.

The **President** remarked that in the higher ranges of 450–500 B.Th.U. there was very little effect on the appliances, with a variation of up to 5%. When lower values were being considered, volume was important.

A vote of thanks was proposed by Mr. **H. Platt** (Bolton), and seconded by Mr. **R. S. Cureton** (Northwich).

Views of an Architect

In an Address to the London and Southern District Junior Gas Association Mr. P. V. Burnett, F.R.I.B.A., referring to the large amount of heat lost through walls and floors and unprotected pipes, said it was ridiculous that the work of thousands of miners should be sheer waste so that landlords could make profit by saving the cost of insulation. Space heating, he continued, was a subject where efficiency came into conflict with psychology. In spite of the discoveries of modern science, the public obstinately adhered to their preference for the open coal fire, which was the most inefficient, wasteful, and labour-making appliance that could be imagined. However, the comfort factor was such that expense and labour were regarded as relatively unimportant. The public liked to see a flame. An electric fire was a dull and soulless thing, psychologically uninteresting. Some modern types of gas fire substituted an evenly glowing panel for the sight of flame, but the advantage of a visible flame was lacking.

Concerning water heating, Mr. Burnett said he regarded the contribution of the Gas Industry as the only satisfactory solution so far produced. In this field the Industry was supreme. And in regard to cooking, he expressed the view that gas would continue to hold its place, though he looked forward to "ovens without a naked flame," and oven doors which did not throw a shadow inside the oven.

Cooker Construction

The frame structure of a gas cooker is the subject of a patent (No. 546,109; application date, Dec. 20, 1940) taken out by Turley & Williams, Ltd., C. D. Smith, and D. H. Otton. According to the invention, the main frame structure of the cooker is formed of a framework of L-section or like flanged bars which are welded or otherwise fixed together to form a rigid structure. According to one form of the invention, the main framework of a gas cooker comprises four upright corner angle bars which are connected at intervals by horizontal cross L-section bars at the sides, back, and front. The ends of the cross bars are shaped to form a joint with the outer faces of the flanges of the corner and cross bars lying flush. The bars are welded together to form a rigid rectangular internal frame which supports sheet metal facing panels forming the exterior and interior facings of the cooker. The front sheet metal facing panel has openings for the oven and also openings for a crown plate with a front cover panel and a hot chamber drawer, the sides of the facing and the sides of the openings being flanged. The interior metal facing of the oven is bolted to the flanges of the front facing and the front facing is bolted to the angle iron frame. The side facing plates are bolted to the rear corner pillars of the frame, and the back facing panel is also bolted or pinned to the rear corner pillars. The bottom of the oven is formed by a sheet metal plate, the front end of which passes under a horizontal flange on the front panel. The side panels of the interior of the oven are ribbed to form runners for the usual shelves or racks. The main frame is thus formed as a single welded unit and the structure is completed by metal facing panels.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS

Presidential Address

by

Lt.-Col. F. J. BYWATER, M.C., M.Inst.C.E.

THE Annual Meeting of the Southern Association has always been looked upon as a happy family gathering, where officers of large and small undertakings meet to discuss their problems, and to gain inspiration or guidance from their successes or failures; and to us as an Association it is an inspiration to remember we commence to-day the 69th year of our existence, and that for this long time we and our predecessors have been members of this fellowship for mutual assistance.

When we met a year ago, after an interval of two stormy years, we hoped that the wheel of our national fortunes had ceased to turn so relentlessly against us. But this was not to be, and for some months we and our Allies suffered many reverses. Today, however, with more and better weapons, and more and better trained men, we look forward confidently to the commencement of the general attack which will bring us nearer the end. In this great struggle I think we can claim that the Industry has played an honourable and essential part, and we may hope that as officers of this great public service, intimately concerned with the maintenance of the morale of the people, and the supply of an essential fuel for war industries, we have not been found wanting.

Air Raid Precautions

The time is not opportune to say much about our wartime activities. When peace comes I hope it may be possible to persuade Mr. McLeod, my Company's Distribution Engineer, to tell you how we have dealt with the problems of maintaining gas supply after air raid damage. I may perhaps, however, be allowed to speak of these in brief and general outline. When the international situation steadily deteriorated in the summer of 1939 it was necessary, in addition to the precautions suggested by the Government, to prepare plans to ensure the repair as soon as possible of damage which might occur to our distribution system—for our district is extensive and we do all our own work. A considerable expansion of the main-laying gangs was obtained by training a number of the more experienced service layers and gas fitters to lay mains up to 12 in. diameter. Additional temporary depots and stores of pipes and tools were established throughout the district, and a schedule prepared for manning these posts with standby men. As far as possible the depots were placed sufficiently near but not actually in areas most likely to be bombed intensively, and those in vulnerable areas were either manned lightly or evacuated. The reason for this was to reduce casualties to a minimum while the men were standing by, so that when called upon they might go out fresh and unshaken; these men, of course, worked at their normal duties during the day and stood by on a roster at nights and during weekends. When intensive bombing commenced all the emergency posts were fully manned, and the arrangements worked excellently, receiving frequent commendation from the municipal authorities. The men have behaved magnificently, never hesitating to respond to any calls made upon them, and it gives me great pleasure to pay tribute here to their bearing and the work they have done. No doubt they have found that complete absorption in urgent work is the finest antidote to nervous tension.

During our preliminary preparations, and as opportunity occurred, numerous bagholes were cut in the mains at certain strategic points, so that bags could be inserted quickly for the purpose of isolating mains that might be damaged. The large number of valves required could not have been obtained in the time available, and their cost and the labour involved would have been prohibitive. These bagholes also proved most useful for the removal of water from flooded mains, and enabled us to employ large pumps for this purpose. Many 4 in. suction pipes on syphons were also converted to 2 in. and 3 in. diameter, for flooded mains were a great trouble to us in the early raids, and were responsible for 75% of the interruptions to supply. The pipe track across large craters was frequently piled, as my experience as a sapper in the last war had convinced me that high explosives when detonated beneath the surface of the ground almost invariably make the earth spongy to a considerable depth. In other cases every care was taken to reduce to a minimum any risk of subsequent settlement. The extra labour involved was fully justified, as careful search for escapes has failed to detect any increase, and our unaccounted-for gas in the year 1942 was only 0.10% compared with 0.25% in 1938. I need not remind you what heavy and recurring losses are involved annually due to unaccounted-for gas. We have always given great attention also to ensure accurate registration by station and consumers' meters; but in any reference to unaccounted-for gas I must pay tribute to the practice which for many years has been followed in my Company by the use of turned and bored joints. You will be interested to know that we find these joints cheaper than socket and spigot lead joints, and our experience has been that they are not inferior to lead joints in withstanding the transmitted shock of high explosives. I should add that in dealing with broken and ignited mains the golden rule of keeping at all costs a pressure in the main was strongly impressed on everyone concerned, and I am glad to say that except for a small explosion in a consumer's meter we have so far had no mishaps from explosive mixtures.

Coal

As one of the representatives of the Industry on the Government's Public Utilities Coal Committee, it is fitting I should make some reference to coal. My colleague, Mr. Samuel Tagg, and I have done our best to serve you, but we are conscious that many of you are not at all satisfied with the quality of some of the coal you are receiving, nor with the price you are having to pay for it. The facts are that the constantly increasing demand for war industries, and the demand for high priority processes, have deprived the Industry of large quantities of good gas coal, which have had to be replaced either by inferior material or by coal less suited to our plant, and these have been supplemented during the summer by grades normally used for domestic purposes. The Coal Supplies Officers have had great difficulty in providing for everyone, as the Services and various Production Ministries have had first claim on what has been available. However, thanks to a comprehensive census made by the Coal Survey Department of the Fuel Research Station, an investigation is now being made of the coal supplied to every factory in the country, and with the sympathy and active support of the Ministry, I hope we may soon be able to recover some of our normal qualities.

When considering Durham coal it should be remembered that included in the term "Durham" there are many grades used for gas making, ranging from highly swelling coking coals to first-class gas coals. Most of the coking coals are quite unsuitable for use in vertical retorts of the usual design. In horizontal retorts, however, there should be no difficulty, and with reasonable carbonizing practice coking coal can be relied upon to give 450/500 B.Th.U. gas. All the other Durham coals can be used in horizontal retorts without any difficulty, but advice should be sought from the P.U.C. Committee about their suitability for various designs of vertical retorts. Throughput is unfortunately generally reduced by the use of most Durham coals unless the plant has been specially designed for them, but losses in this respect can frequently be reduced by selecting for the plant the most suitable coals available.

The prices charged for diverted house coals have caused many complaints, and in this matter we have been unable to render you much assistance. Every grade of coal is now given a fixed price for the purpose of ascertaining miners' wages, and whoever takes that coal must pay the schedule price for it. We have been able, however, to secure some amelioration of our grievance by taking care that only the most suitable house coals are diverted.

You have no doubt gathered from the Press that the coal position is still not satisfactory. This is a very complicated problem, and it is not appropriate that I should discuss it further here. We and other users of coal are, however, much disturbed by the grave suspicion that output is now being applauded at the expense of quality and cleaning. We are told that the transport system of the country is working to full capacity, but surely it is false economy, and indeed extremely wasteful, to transport daily over many miles thousands of tons of rock and band which ought to have been removed at the colliery. Not only do the users of coal have to pay for this inert material, but its inclusion causes serious dislocation and loss of potential output from industrial plant, and probably to none more than to those of our own Industry.

We shall probably end the winter with satisfactory global stocks, thanks partly to the economy campaign and partly to the exceptionally mild weather. But I would urge that we should not be misled by our present position, and strongly advise all undertakings to receive as much coal as they possibly can during the next six or seven months, and it will be an enormous help if trucks are turned round as soon as possible. Before leaving the subject of coal I must pay tribute to the great assistance which all of us are constantly receiving from our colleagues who act as spokesmen in the various districts.

I shall refrain from further reference to wartime problems, although I am very conscious that you have many others, and will pass on to those matters which we contemplate, or to which we devote ourselves in what spare time we have—I refer to questions concerning our future.

Ministry of Fuel and Power

One of the men who have had a profound influence on the social and political world of to-day has said: "Experiences of war, like the

experiences of every sudden turn of human life, stun and break some people but enlighten and harden others." Far from being broken by our experiences, and whatever the condition of our national fortunes has been, one of the most significant features of this war is that the nation, without any external stimulus, and urged only by a supreme and dogged confidence in the outcome, has set itself to examine and discuss every kind of political, social, and industrial aspect of our affairs, and no section of the industrial world has been more active in these matters than the members of our own Industry. Into these discussions was interjected eighteen months ago the welcome news that the Government had decided to assemble all the fuel industries into one Department of the Board of Trade, and to appoint Dr. E. W. Smith to be Director-General of the Gas Division. Later, as you are aware, the Government further developed its plans by establishing what many of us have constantly hoped for during the past 25 years —a Ministry of Fuel and Power, with Dr. Smith as Director of the Gas Division. This decision was again warmly welcomed by the Gas Industry, and indeed by the whole country, as giving a clear indication that the Government looked upon fuel as one problem, complicated unfortunately by the necessity of importing a large percentage of our liquid fuel requirements.

There is no shadow of doubt that, having regard to this gap in the nation's fuel resources, and to our abundant supply of excellent coal, the establishment of this Ministry has been delayed far too long. Far too long we and others who have studied this highly complex material, coal, have urged that it was much too valuable to be used as a raw fuel, to darken our skies and foul our cities and countryside with smoke and smuts. Further, we have seen millions of tons of it exported every year, to be carbonized and stripped of its valuable by-products, and every encouragement given by Government and colliery companies for the development of this trade. In fact, there have been numerous occasions when first-class gas and coking coal was being received on the Continent at a price lower than it could be bought in London. Surely if coal is to be processed it should be done in this country. May I give you a simple analogy the truth of which is well known to most of you? Up to 45 years ago enormous numbers of live cattle were imported annually into this country from North and South America, and slaughtered in large abattoirs at Liverpool, Deptford, and elsewhere. The development of refrigeration and the chilling process, however, gave exporters an opportunity they were not slow to seize. The cattle were killed abroad and processed, the carcasses only coming to us, leaving behind valuable by-products—hides, horns, hoofs, fats, hair and offals—which have formed the basic raw materials for great industries which now supply their finished products to this country. As far as possible we should endeavour to apply the same principle to our coal, and not send it abroad to be stripped and so provide materials for competition with our own industries.

As an Industry, therefore, we have heartily welcomed the establishment of the Ministry of Fuel, and I certainly hope that as soon as possible the Minister will appoint a commission of impartial people—technicians, industrialists, and those concerned with the domestic life of the people—to enquire thoroughly into the spheres and potentialities of each fuel, for it is an urgent economic necessity that we should make the best use of our coal. We shall have no anxiety about the result of such an Inquiry.

It gives us all great pleasure to welcome here to-day one of our members as President of the Institution. Mr. E. V. Evans for many years has devoted himself with great enthusiasm to the close study of the processing of coal, and has made this the principal theme of his year of office. I have no doubt he will use all the influence which that office confers on him to urge upon the Minister the views he so strongly holds. Our Industry serves the country in a two-fold capacity —it carbonizes nearly 20 million tons of coal every year, stripping it thereby of its valuable by-products to provide raw materials for many other industries, and giving back to the nation 10 cwt. of smokeless fuel and 75/80 therms of gas for every ton of coal it uses. In short, we as engineers are carrying out the first duty of our profession in converting for the use of man one of the great sources of power in nature, and, what is most important, performing this service with the maximum of economy.

Research

We also welcome the President as Chairman of the Gas Research Board, which among other things is trying to solve the extremely difficult problem of placing on a practical and economic basis the complete gasification of coal. As an advocate of this from my earliest days in the Industry, may I on your behalf offer to him and to the Board our best wishes for the success of their work? The Board has not been long in existence, and no doubt the limited funds placed at its disposal, and now the limitations imposed by the war, have restricted its work; but I hope it will go ahead with renewed vigour after the war, for in addition to complete gasification many other problems remain to be solved. Large sums of money have been spent on investigation and research work by many of the big gas undertakings and by makers of gas apparatus and appliances, but as far as possible this work should be co-ordinated and given central direction. Private enterprise will always demand and should receive support for a considerable amount of freedom, but in working from first principles much waste can be avoided by co-operation in which the interests of all are served.

Competition

No doubt you all read in the Press a few days ago the account of Major Lloyd George's call to us and to the electricity industry that we should cease the internecine struggle which has existed between us for so many years. As the Minister truly said, "the two are complementary to each other," and every sensible gas engineer agrees that this is so. It has been my privilege during the war on various joint committees to meet and work with a number of the leading electrical engineers, and I have never heard from them any views differing from this. It is only when the propagandists of big finance get to work, or the enthusiastic imagination of the Women's Electrical Development Association runs riot, that we really get annoyed with our friends on the other side.

I dislike very much suggesting any similarity between some of this propaganda and that which was recently so common among our enemies when speaking of "the decadent British people"; but it has an unhappy resemblance to their claim that the future belongs to the young nations. This kind of thing, as the Minister warned us, should be stopped. There are vast untapped fields of development awaiting both of us in the industrial and domestic affairs of the nation, and we should cease this waste of time and money in a struggle which should not be tolerated in the twentieth century. Much as one recognizes the tonic effect of competition, this does not excuse the waste of large sums of money which in the end have to be provided by the people of this country.

Post-War Planning

Meanwhile, we have to put out own house in order, so that we may acquit ourselves creditably in the post-war world. It has become abundantly clear to thoughtful people that in some respects the organization of the Industry is not such as will enable it to meet effectively all the developments which may take place. The British Gas Industry, like so many of our industries, grew up as individual independent units in an individualistic world, and we must be prepared, like other industries, to move with the times, and submit ourselves to schemes of rationalization and combination which are an essential part of modern economics. I think it is generally agreed that this is absolutely necessary, and Dr. E. W. Smith has performed a most useful service in pointing out some of the directions in which we are lacking, and in fixing our attention on the construction of a new and better organization. It is a matter of great regret to us that we have to go forward without his official assistance, and his resignation has caused widespread regret. I am sure he would prefer that I should not say more about this matter, but I know I am voicing your wishes in extending to Dr. Smith our sincere sympathy that the work which obviously he was enjoying, and had so much at heart, is not to be continued by him, and to express the hope that he will still give the Industry the benefit of his counsel and assistance.

Many thoughtful Papers and constructive criticisms of the present organization of the Industry, together with proposals for the future, have also been put forward during the past two years. It is not my purpose to add to these, except to suggest that the problem is a difficult and intricate one and cannot be lightly undertaken. As you are aware, a Post-War Planning Committee was appointed 18 months ago to enquire into this and other matters which may require to be taken in hand either now or after the war. This Committee has met frequently and appointed a number of special Committees to deal with sections of its task. I shall endeavour not to contravene the dictum of Aristotle "that we shall be wise to eschew those matters in which our counsel might fail to be authoritative," but I cannot help thinking that if we are to proceed with as little delay and friction as possible the Post-War Planning Committee, in this question of Reorganization of the Industry, should confine itself to collecting factual evidence, and then suggest an outline scheme founded on what appears to emerge from the facts.

We are told that other Industries, notably steel and cotton, have reorganized themselves internally, but I need not point out how very much they differ in control and responsibility from our own. It seems inevitable, and in fact desirable, that there will have to be some form of Government control, and even compulsion, for any voluntary scheme may be ruined or seriously weakened by abstentions. This country, however, has grown great on individual enterprise, and regimentation has either been resisted or stultified us as a people. We shall be wise, therefore, to exercise great care in this matter of inviting control from Whitehall, and take what precautions we can to see that reorganization will yield the maximum of assistance with a minimum of interference compatible with efficiency and service to the consumer; for this must be the only criterion on which any scheme should be judged. In the end it is inevitable that the Government will have to decide what is to be done, but I think we have all been impressed so far that the Minister wishes to be friendly and helpful. I hope, therefore, it will be possible for an impartial enquiry to be held by a committee on which all interests concerned are represented, and before which all the interests affected will be heard. If this is done, I sincerely

hope the Industry will loyally accept any decision which may be reached.

Education

I cannot conclude my Address to you without referring briefly to education—to me a subject of the greatest importance. My predecessor in the Chair also referred to it last year and there has been some progress since then, for there is now a prospect that, after a suitable interval when peace is declared, the Institution will require from those seeking admission a certain standard of technical and educational qualifications, comparable with that required by other scientific institutions. This is all to the good, for the Industry can only flourish if its technical control is in the hands of well qualified men.

It is, however, in the wider sphere of education I would urge that serious attention is required. In my view the vast sums of money spent on education in this country yield a poor return as an investment. Why is it that so frequently we hear complaints about the young men who come straight from school into factory, workshop or office? And yet after a military training these youths make magnificent soldiers, sailors, and airmen; their discipline and devotion to duty, to their country, and their fellows have never been surpassed in the world's history. Surely there is something wrong with a system which is supposed to fit these youths equally well for civil life, but which apparently fails so frequently in its results.

I am not concerned here with political systems, and it may be that, as a result of the war, Russia in such matters will learn as much or more from us as we may learn from them; but *we* have *much* to learn from them about the training and education of young people, for I am convinced we are not treating ours—boys or girls—fairly. Religious teaching has become a diminishing factor in their lives, and we have not replaced it by any other ethical training—we have no longer a code or ideals to which young minds are directed. A great Englishman has said, "You do not educate a man by telling him what he knows not, but by making him what he was not." Our education is largely a mechanized affair, consisting of packing heads with facts, while little attention is given to real education and the formation of character—to teaching young people to think tidily and express themselves accurately; to realize their duty to parents, to their fellows, to the State, and, when they go to work, to their employers; all these things are left to chance and environment, or to such movements as the Boy Scouts.

If there is one important post-war problem to which we should devote ourselves, not only as members of our own Industry, but as citizens of a great country, it is in my opinion our incomplete system of education. No nation can continue to flourish unless its people have ideals as well as being equipped to earn their daily bread. The future, however, is full of promise. This country has never stood higher in the estimation of the world, and we have a great leader, whom we all hope will be spared to guide the nation in dealing with the many difficult problems of the post-war world.

RADIATION LIMITED

The Annual General Meeting of Radiation Limited was held on March 31 at the Incorporated Accountants' Hall, Victoria Embankment, London, W.C.

Mr. J. F. DAVIES (the Chairman), who presided, said:

Dealing first with the annual accounts, the balance sheet and the profit and loss account of Radiation Limited are in the usual form, but this year your Board regret it is not possible to include the statement of combined assets and liabilities of the Subsidiary Companies. The reason is that the Subsidiary Companies are unable to complete their annual accounts for 1942 because final terms have not been settled in respect of contracts representing a substantial part of their trading. Future accounts, however, will include a statement showing the combined figures of the Subsidiary Companies.

You will see from the Radiation profit and loss account that the gross income from Subsidiary Companies for the year is £290,078, an increase of £30,798. After deducting income-tax, but including transfer fees and bank interest, the net income for the year is £145,913, so that adding the balance brought forward from the previous year, there is a total of £293,627 to the credit of profit and loss account. In view of the probability of having to meet considerable expenditure in the immediate post-war period in turning over to our normal production, it has been thought advisable to allocate £20,000 from this year's profits to general reserve, and, after providing that amount and the interim dividend on the preference stock, there remains available a balance of 257,314, which appears in the balance sheet.

It is proposed to pay the final dividend on the 6% preference stock, and a dividend of 8% on the ordinary stock for the year. These dividends, less income-tax, will absorb £106,815, leaving a balance of £150,499 to be carried forward to the credit of profit and loss account. This is an increase of £2,785 compared with the balance carried forward a year ago.

The proposed dividend of 8% on the ordinary stock compares with 6% declared a year ago. Although it has not been possible to prepare accounts of the Subsidiary Companies for the year, your Directors have carefully reviewed the position and have decided they are justified in recommending the payment of the increased dividend on the ordinary stock.

On the assets side of the balance sheet the chief items are: £2,392,675, the cost to Radiation of the whole of the shares in the Subsidiary Companies, and £1,385,613, the amount due to Radiation by those Companies. The latter item includes the dividends for the year 1942 declared by the Subsidiary Companies, the balance of their dividends for past years, and charges paid in the first instance by Radiation on behalf of those Companies.

I do not think it necessary to refer to the other items in the Radiation balance sheet, except to point out that the general reserve now stands at £260,000 as a result of the transfer this year of £20,000 to that account.

In the absence of completed accounts from our Subsidiary Companies, it is obviously impossible for me to make the usual detailed comment which has always been given to our stockholders, and I cannot say more than that on the whole your Directors regard the results of the year 1942, so far as they can at present be estimated, as reasonably satisfactory, and that we have been able to maintain in all essentials the strength of our financial position. This is a subject to which your Directors attach importance in view of the uncertainties of the future and the calls which we may have to meet.

Before the present state of emergency arose, the major interests of Radiation Limited were associated with domestic gas appliances supplied to the public through the Gas Undertakings. In face of restrictions necessarily imposed on these activities, the year under review has been a period of further curtailment for such appliances, but our efforts have been engaged in other important directions, and the whole of our factories have been fully employed.

I welcome this opportunity to pay a well-earned and ready tribute to the work which has been performed by the gas undertakings of the country. The Industry can look back upon the past 3½ years with a sense of pride, and when the time comes for the story to be told, the public will have good cause to be grateful to the gas undertakings for the services they have rendered to the nation.

Apart from the contribution which, through its by-products, the Gas Industry has made to the national war effort, householders have been blessed with almost unbroken service of gas for cooking and heating, and in these days of lack of domestic help, the housewife—and the householder himself—have cause to be grateful to the gas undertakings for excellent service under difficulties which at times must have seemed wellnigh insuperable.

The Fuel Economy Campaign has achieved important results to date, but continued vigilance is needed to ensure that the economies achieved are well maintained. The Gas Industry has given a direct lead in this as much by its efficient treatment of the raw coal it uses, as by the provision of adequate supplies to Industry of fuel in a form peculiarly suited to the many exacting demands of modern production. The curtailing of domestic supplies on a voluntary basis, whilst a reversal of all pre-war policy, has been signalized by the full co-operation of the Gas Industry and the general public in a great effort to ensure that the maximum quantity of gas shall be available to essential industry.

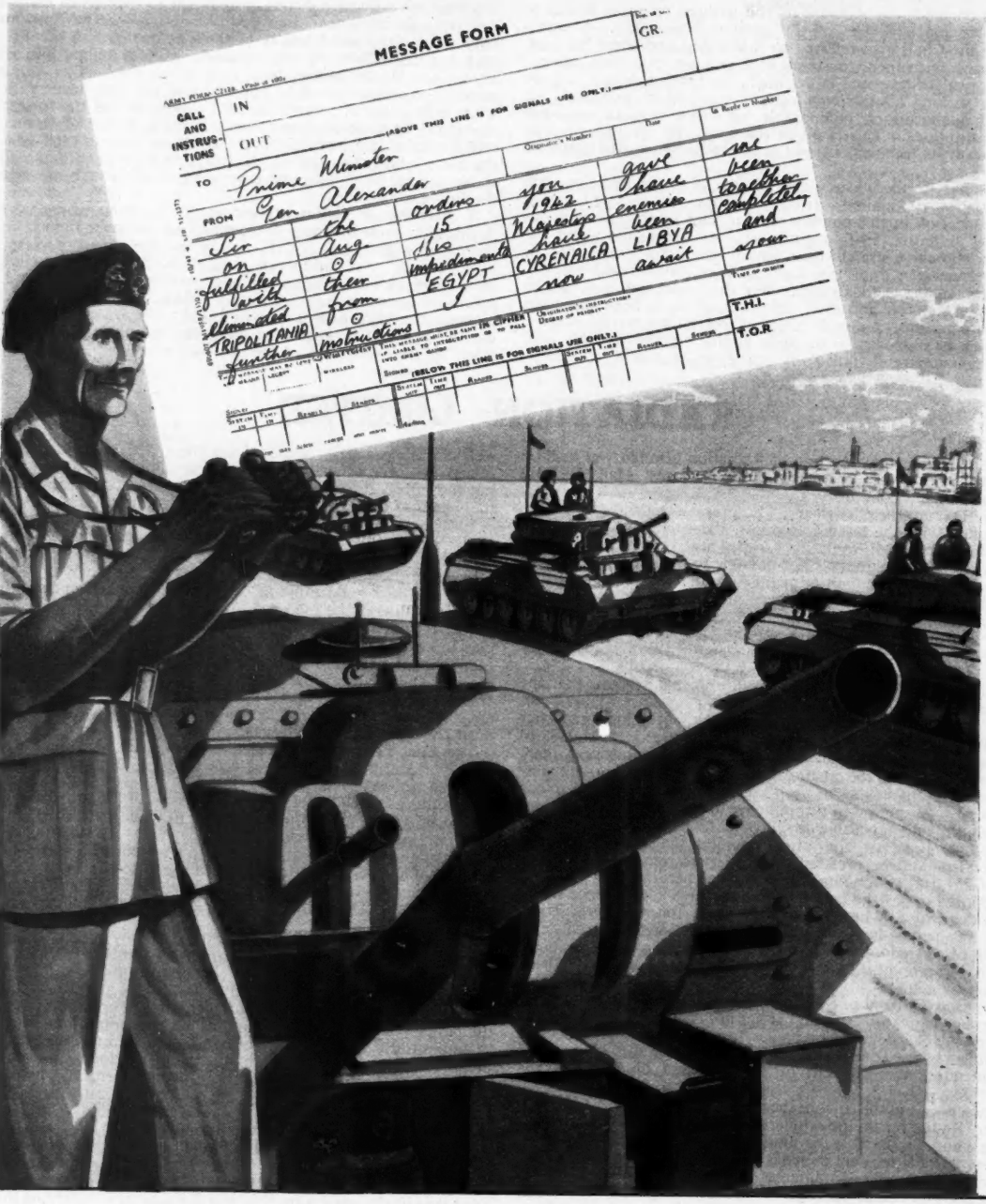
The last-mentioned aspect—domestic economy of gas—is intimately bound up with the type of gas apparatus available to the householder. An example of this is seen in the contribution made to fuel economy by the use of the "New World" gas cooker, and other Radiation specialties, which, on account of their high thermal efficiency, give the best service with the minimum of gas consumption and labour.

Radiant heat has long been recognized as the most pleasant source of warmth and comfort in domestic rooms. Pioneer research work by Radiation Limited drew attention to the beneficial properties and therapeutic value of short wave length infra-red radiation, details of which have been given in the past in our publication—"Radiant Heat and Comfort." In the post-war period we shall have available gas fires which will more than maintain the high standard of achievement already reached.

There is to-day throughout the nation a feeling of expectation and hope that in the years after this war the general standard of living, of amenity and of comfort may be raised. Whether that hope can be fulfilled is not for me to say, but so far as may lie within their power, the Gas Undertakings and the gas appliance makers will undoubtedly do all they can to help to that end.

To-day it is well recognized by all intimately concerned with the subject that the gas appliance industry has done valuable and important work in the development and improvement of appliances. Radiation Limited can look back to its own record in that respect with pride, but not—let me add—with complacency. On the contrary, we are never content, and always striving to improve, and when we can again resume our full scale of activity on that side I can say now that we shall be able to record much progress.

The Ministry of Health, and the Ministry of Works and Planning, have rendered valuable service in bringing home to the people generally a better realization of the extent to which the activities of various sections of the community must be co-ordinated, in order to ensure



Well done, the "Eighth"!

"Everywhere in Egypt is a feeling that Britain has kept her word, that we have been a faithful and unfailing ally, and that we have preserved the Nile Valley . . . from the horrors of invasion. . . . What an amazing feat this has been . . . without parallel in modern war."

Right Honourable Winston Churchill, C.H., M.P., Prime Minister, 11th February, 1943

THE PARKINSON STOVE COMPANY LTD. (STECHFORD), BIRMINGHAM, 9

that in new homes the best and wisest use shall be made of all opportunities and means for providing better standards of health and comfort.

Architects throughout the country are giving much attention to future planning, and they no doubt appreciate the help received from Government-sponsored organizations, such as the Building Research Station.

This department, for example, has been able to show the extent to which it is possible to reduce the annual fuel bill by employing materials with better insulating properties than those commonly adopted in the past.

To-day there is a greater appreciation of the need for giving first consideration in house design to the provision of the three heat services—namely, heat for cooking, for space heating, and for water heating. We have found that many of the leading architects have these matters well in mind in considering the proposals they will make to their local authorities on house design.

Everything which will contribute to economy in the home, whether in terms of money or of personal labour, is worthy of special consideration. I can but hope that, despite the urgent and pressing needs of the day, it may be found possible to make available for our own and other industries the small amount of labour required for the important work of preparation for the future.

Before I close I wish to take this opportunity of saying how greatly the Board and myself appreciate the continued efforts of the staffs and workpeople at our various works: the year 1942 was not an easy one for them—in addition to their long hours of work, they have had duties in connection with Home Guard training, A.R.P., and fire watching, and I think they have come through the year with excellent spirit.

Our best wishes go out to the employees who are serving in the various branches of His Majesty's Forces, and we hope for their safe and speedy return. Some have given their lives in the service of their country, and to the relatives of those we extend our sincere sympathy.

Tottenham and District Gas Company

The annual ordinary general meeting of the Tottenham and District Gas Company was held on March 23, at Woodall House, 658, Lordship Lane, Wood Green, London, N. 22.

Mr. Henry Woodall, the chairman, who presided, said: The notice to the proprietors convening the annual general meeting sets out clearly the limitation of the business to be conducted, namely, to declare dividends, to elect a director and auditor, and to transact general business. It will be seen also, in accordance with the Government Direction and Order, that neither accounts nor the report of the Company may be published. The accounts and report may be inspected at the office of the Company by any person entitled so to do upon giving not less than seven days' notice to this effect. I think I am entitled to say, with every satisfaction, that the dividend proposed has been fully earned, and I would also like to say that all your plant and property have been kept in an excellent state of repair.

With regard to War Damage, the promised Bill has not yet been introduced, but the Government scheme has been set out in a White Paper published in November last. Nothing conclusive is yet known, but the Company has set aside contributions to meet a probable levy.

Your directors are preparing as far as they can for the post-war period. We must not be unprepared and we are already making ready for the future. Estimates are not easy to make, but we are keeping all our plant up to date and getting material together as far as we can for renewals and extensions. Your directors have every confidence in the future. It is true there are many people who are electrically minded, and we are making it our business to see that the merits of and the necessity for gas are more fully understood. A good and abundant supply of gas is essential for the needs of the country and we are prepared and preparing to give it.

We have naturally been studying the Beveridge Report and we entirely support its principles. In this Company we have for many years attempted to do for our own people what Sir William Beveridge suggests should become a national responsibility. Our co-partnership scheme forms the basis of nearly all our efforts in welfare, including contributory pension funds, &c. In the various schemes the Company and employees co-operate and are happy to be able to do so. These joint efforts have brought the employers and employees very closely together, and have been a great factor in the success and happy working of our undertaking. It is hoped that the Beveridge proposals may be wide enough to allow us to keep our own scheme going, which has worked so well, and that we shall not lose our individuality and be absorbed in a great national scheme.

It is fitting that I should conclude with a very hearty vote of thanks to our officials, their staffs, and workmen. Some of you know the many difficulties which have been caused by the various necessary restrictions, and when you remember that in addition to doing their work adequately, practically all our men and women have additional work to do in connexion with the Home Guard, A.R.P., and Fire Watching Services, you will realize what special thanks they deserve for their work during the year. Our men are continually being called up for National Service. Many are in His Majesty's Forces at home and abroad—among them are two of your Directors, Major Edward C. Woodall and Major Charles S. Pryor, both of whom joined up just before the war started. We still keep in touch with our men wherever and whenever possible. I am sure they will be glad to know they are constantly and kindly remembered by those they have served so well. They will be very heartily welcomed when they return to their old jobs which are waiting for them. There is one class in particular I should not like to forget. As you are aware most of our coal is sea-borne, and we do very gratefully remember the gallant men who are engaged in this hazardous enterprise.

The Chairman then moved the following resolution: "That final dividends for the year ended December 31, 1942, be declared and payable on March 25, that is to say, 2½% actual on the 5% Preference Stock, 2¾% actual on the 5½% Preference Stock, and 2½% actual on the Ordinary Stock, all less Income-Tax; that the dividend warrants be sent to the proprietors by post."

The resolution was unanimously adopted. The retiring director (Mr. Arthur E. Broadberry) was re-elected, and the auditor (Lieut.-Colonel W. C. Smith, D.S.O., M.C., F.C.A.), having been reappointed, the proceedings terminated with a cordial vote of thanks to the chairman, directors and auditors, and also to the officers, staffs, and workmen for their services during the past year.

Scottish Gas Development Centre

A Scottish Gas Development Centre has been established with headquarters at the Glasgow Corporation Gas Department's Central Showrooms, 522, Sauchiehall Street, Glasgow, C. 2.

Some 80 Scottish gas undertakings have joined the Centre, which will deal with industrial and domestic matters. Mr. D. Fulton, of Helensburgh, has been appointed Chairman of the Advisory Committee to act in conjunction with the Glasgow Corporation Gas Department.

Mr. Alex. Bujnowski, M.C., Sales and Publicity Officer, Glasgow Corporation Gas Department, has been appointed Secretary of the Centre.

A Meeting of the Central Executive Board of the National Gas Council will be held at Gas Industry House on April 13, at 2.15 p.m.

A Meeting of the Central Committee of the Federation of Gas Employers will be held at Gas Industry House on April 13, at 11.30 a.m.

The Fifth Annual General Meeting of the Midland Counties Coke Association will be held at King Edward House, Birmingham, on April 29, at 2.30 p.m.

The Manchester District Association of Gas Engineers will hold their annual meeting in Manchester on April 2, when Mr. W. Fletcher will give his Presidential Address.

The Spring Meeting of the North British Association of Gas Managers will take place in Edinburgh on April 9, when Mr. R. M. Simpson will deliver his Presidential Address. An Address will also be given by Mr. E. V. Evans, President of The Institution of Gas Engineers.

The Annual General Meeting of the London and Southern District Junior Gas Association will be held on April 30 at Gas Industry House, at 6.30 p.m. At the conclusion of the business meeting an Address will be given by Mr. E. V. Evans, President of The Institution of Gas Engineers.

General Meetings of members of the National Gas Organizations in Scotland will be held as follows: April 28—Federation of Gas Employers, North British Station Hotel, Edinburgh, at 11.30 am.; National Gas Council, 2.30 p.m. May 5—British Commercial Gas Association, Central Station Hotel, Glasgow, at 2.30 p.m.

The Sessional Meeting of the Illuminating Engineering Society will be held on April 13 at the E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, W.C. 2, at 5 p.m. A Paper entitled "Photoelectric Photometers: their Characteristics, Use, and Maintenance," will be read by Mr. J. S. Preston, M.A., F.Inst.P., A.M.I.E.E. Admission by card only, which may be obtained on application to the Secretary, The Institution of Gas Engineers, 1, Grosvenor Place, S.W. 1.

Messrs. Ashworth & Parker, Ltd., Bury, inform us that Messrs. Walmsleys (Bury), Ltd., papermakers' engineers, have taken a controlling interest in their business as from Mar. 1. Messrs. F. O. L. Chorlton and W. S. Parker have retired from the Board and the vacancies thus created have been filled by the appointment of Mr. J. Wolstenholme (Chairman) and Mr. R. P. Timpany. Messrs. E. S. Hardman, Chief Engineer, and H. Sheldon, Commercial Manager and Secretary, who have been with the Company for many years, retain their seats on the Board and will be responsible for the management. The firm will continue as a separate concern and concentrate as before on the manufacture of high-speed steam engines, strainers, governors, and paper machine drives.

Gas Products Prices

The London Market Mar. 29.

All Coal Tar Products are in good demand, and Pitch in the London area remains about 45s.

The Provinces Mar. 29.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 1s. 10d., pure, 2s. 5d. (controlled by the Control of Toluene No. 2 Order, July 3, 1941, which fixes the maximum price at which this material may be sold). Naphtha and Xylol controlled by the Coal Tar, Naphtha, and Xylol Order, 1942, dated Dec. 7, 1942, and operative from Dec. 21. Carbolic acid, 60's, naphthalene, and anthracene controlled by the Coal Tar Products Prices Order S. R. & O. 2509, dated Dec. 7, 1942, and operative from Jan. 1, 1943. Filtered heavy oil (min. gr. 1,080), 7½d. to 8d. Creosote oil has been generally controlled as to direction and price for some time past. Current value—fuel grades 5d. to 5½d.; timber preservation and other purposes 4½d. to 6d.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Tar Products in Scotland Mar. 27.

Market is steady, with prices unchanged. Refined tar controlled. Value is 4½d. per gallon *ex* Works, naked. Creosote oil: Specification oil: 6½d. to 7d.; low gravity, 7½d. to 7¾d.; neutral oil, 6d. to 6½d.; hydrogenation oil, 5¾d. per gallon; all *ex* Works in bulk. Refined cresylic acid is changing hands at 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha: 6½d. to 7d. per gallon. Solvent naphtha: Basic prices delivered in bulk, 90/160 grade 2s. 8d., and 90/190 Heavy naphtha, Unrectified, 1s. 10½d.; Rectified, 2s. 3d. per gallon. Pyridine: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

Gas Stocks and Shares

Stock markets presented a somewhat brighter appearance for the greater part of last week although towards the close the volume of business tailed off. The tone, however, remained firm. There was also a better demand for gas stocks and shares, and the effect of this can be seen in the number of appreciations in value shown in the lists below—preference and debenture issues being particularly strong features. These included a 5s. rise in Cape Town 4½% preference, business being recorded at 60s. against 49s. the previous week. Another sharp rise was that of Barnet ordinary, which closed 10 points up at 147½. South Metropolitan 6% preference continued in demand and gained a further 8 points. On the resumption of dividend payments on this stock the quotation has risen 38 points since the commencement of the year. Gas Light units maintained their previous week's level, but Newcastle units reacted slightly on the local Exchange.

The following quotations were altered during the week:

SUPPLEMENTARY LIST

Brighton 5 p.c. Deb.	117—122	+2

PROVINCIAL EXCHANGES

Blyth Ord.	108—110	−1
Bristol 5 p.c. max.	110½—112½	+½
Newcastle Units	22/6—23/−	+−/6d.

OFFICIAL LIST

Alliance & Dublin	82—87	+2
Ditto 4 p.c. Deb.	95—100	−3
Associated Gas & Water 4 p.c. Red. Cum. Pref.	19/—20/−	+−/6d.
Barnet Ord.	145—150	+10
Bournemouth max. Div.	137—142	+2
Cape Town 4½ p.c. Cum. Pref. ...	40/—60/−	+5/−
Colonial 8 p.c. Pref. (x.d.)	⅝—⅞	Mar. 22
Commercial 5 p.c. Deb.	105—110	+2
Gas Consolidation "B" Ord. ...	16/6—18/6	−−/6d.
Gas Light & Coke 3½ p.c. max. ...	66—69	+1
Ditto 3½ p.c. Red. Deb.	95—98	+1
Primitiva Holdings Ord.	12/—14/−	−−/6d.
South-Eastern Gas Corporation 4 p.c. Pref.	16/—18/−	+−/6
South Metropolitan Ord.	72—75	−1d.
Ditto 6 p.c. Pref.	126—131	+8
Ditto 5 p.c. Red. Deb.	103—108	+1
South Suburban Ord.	95—100	+3
Ditto 5 p.c. Pref.	103—108	+6
Wandsworth 4 p.c. Pref.	89—94	+2
Ditto 4 p.c. Deb.	98—103	+3
Watford & St. Albans Ord.	108—113	+2

TRADE CARDS

TOM CARRINGTON & CO. LTD.
Lyndon Toolworks, West Bromwich. T/N 0517 (2 lines).
"LYNDON" and "EGA-KUT"
SCREWING TOOLS;
TAPS; DIES; STOCKS AND DIES;
GROUND THREAD TAPS

HILMOR LTD.
Tube Bending Machines (Hand and Power). Tube Bending Specialists.
Temporary Offices: London Road, Knebworth, Herts. T/N Knebworth 3179.
We can supply machines for bending Gas and Steam Piping from ⅛ in. to 2 in. in the cold state.

M. B. WILD & CO. LTD.
Mechanical Engineers, Argyle Street, Birmingham 7. T/N East 0472.
CAPSTANS. BY-PRODUCTS COKE OVEN MACHINERY. ELEVATORS. CONVEYORS. WAGON TIPPLERS.

POTTERTON, THOMAS (HEATING ENGINEERS), LTD.
Buckhold Road, Wandsworth, S.W. 18. T/N Putney 2263-4-5. T/A Potterton, Put., London.
Patentees and Makers of the **"EMPIRE"** and **"EMPEROR"** and **"REX"** Automatic Gas Water Heaters.

DIAPHRAGM & GENERAL LEATHER CO. LTD.
Franklin Road, Portslade, Sussex. T/N Portslade 8418. T/A Diaphragm, Portslade.
DIAPHRAGM'S DEPENDABLE DIAPHRAGMS supplied to all parts of the World since 1847.

GIBBONS BROS. LTD.
Gas and Constructional Engineers, Dudley. T/N Dudley 3141. T/A Gibbons, Lower Gornal.
Carbonizing Plant, Industrial Furnaces and Heat Treatment, Constructional Steelwork, Coal and Coke Handling Plants, Storage Bunkers, Reinforced Concrete Foundations.

LOCOMOTIVES

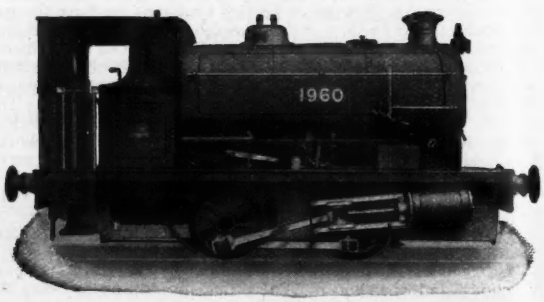
LOCOMOTIVES of all Sizes and Gauges specially constructed for Main and Branch Lines, Contractors, Docks, Gas-Works, Collieries, Iron-Works, Brick and Cement Works, &c. Locomotives of various Sizes always in progress for early delivery.

Photographs, Specifications, and prices on Application

PECKETT & SONS, Atlas Locomotive Works, LTD., BRISTOL.

Telegraphic Address: "PECKETT BRISTOL."

London Representatives: FERGUSON & PALMER, 9, Victoria St., Westminster, S.W. 1.



PRODUCTS INDEX

Furnaces—Heat Treating, Electric
Ajax Electric Co., Inc., 900 Frankford Ave., Philadelphia, Pa.
Despatch Oven Co., Minneapolis, Minn.
Electric Furnace Co., The, Salem, Ohio.
General Electric Co., Schenectady, N.Y.
Holcroft & Co., Detroit.
Holden, A. F., Co., The, New Haven, Conn.
Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.
Lindberg Engineering Co., 2452 W. Hubbard St., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Salem (Ohio) Engineering Co.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Furnaces—Heat Treating, Oil or Gas
American Gas Furnace Co., Elizabeth, New Jersey.
Despatch Oven Co., Minneapolis, Minn.
Drever Co., The, Philadelphia, Pa.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Holden, A. F., Co., The, New Haven, Conn.
Lindberg Engineering Co., 2452 W. Hubbard St., Chicago, Ill.
Pennsylvania Industrial Engineers, Pittsburgh.
R-S Products Corp., Philadelphia, Pa.
Salem (Ohio) Engineering Co.
Stewart Furnace Div., Chicago Flexible Shaft Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo, Ohio.
Wean Engineering Co., Inc., Warren, Ohio.

Furnaces—Non-Ferrous Melting
Detroit Electric Furnace Div. Kuhlman Electric Co., Bay City, Mich.
Stewart Furnace Div., Chicago Flexible Shaft Co., Chicago.

Furnaces—Open Hearth
Amsler-Morton Co., The, Pittsburgh, Pa.
McKee, Arthur G., & Co., Cleveland, Ohio.

Furnaces—Rivet Heating
Stewart Furnace Div., Chicago Flexible Shaft Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo, Ohio.

Furnaces—Sheet & Tin Mill
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

Gage Blocks
Ford Motor Co. (C. E. Johansson Div.), Dearborn, Mich.
Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.

Gages—Electric
Sheffield Corp., The, Gage Div., Dayton, Ohio.

Gages—Plug and Snap
Greenfield (Mass.) Tap & Die Corp.
Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.
Sheffield Corp., The, Gage Div., Dayton, Ohio.
Taft-Peirce Mfg. Co., The Woonsocket, R. I.

Gages—Sheet Thickness
Pratt & Whitney Div. Niles-Bement Pond Co., West Hartford, Conn.

Gages—Thread Lead
Greenfield (Mass.) Tap & Die Corp.
Jones & Lamson Mch., Co., Springfield, Vt.
Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.
Sheffield Corp., The, Gage Div., Dayton, Ohio.

Galvanizing Equipment—Electro
Meaker Co., The, Chicago, Ill.

Galvanizing Equipment—Wire
Vaughn Machinery Co., The, Cuyahoga Falls, Ohio.

Galvanizing—Hot Dip
Cattie, Joseph P., & Bros., Phila.
Enterprise Galvanizing Co., Philadelphia.
Southern Galvanizing Co., Baltimore, Md.

Galvanizing Plants—For Sheets
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Erie (Pa.) Foundry Co.
Wean Engineering Co., Inc., The, Warren, Ohio.

Gas Producers
Koppers Co., Engineering & Construction Div., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Wood, R. D., & Co., Philadelphia, Pa.

Gas Scrubbers
Koppers Co., Engineering & Construction Div., Pittsburgh, Pa.
Research Corp., 405 Lexington Ave., New York City.

Gas—Boosters & Exhausters
Roots-Connersville Blower Corp., Connersville, Ind.

Gaskets—Asbestos, Metal or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

Gates—Motor-Operated
Atlas Fence Co., Philadelphia, Pa.

Gear Checking Equipment
Michigan Tool Co., Detroit, Mich.
National Broach & Machine Co., Detroit, Mich.

Gear Cutting Machines
Farrel-Birmingham Co., Inc., Buffalo, N. Y.
Gleason Works, Rochester, N. Y.

Gear Drives—Herringbone
Continental Roll & Steel Foundry Co., East Chicago, Ind.
Farrel-Birmingham Co., Inc., Buffalo, New York.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh.
Mesta Machine Co., Pittsburgh, Pa.
United Engineering & Fdry. Co., Ptgh.

Gear Lapping Machines
Michigan Tool Co., Detroit, Mich.
National Broach & Machine Co., Detroit, Mich.

Gearmotors
Allis-Chalmers Mfg. Co., Milwaukee.
General Electric Co., Schenectady, N. Y.
Reliance Electric & Engineering Co., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh.

Gear Planing Machines
Gleason Works, Rochester, N. Y.

Gear Shaving Machines
Michigan Tool Co., Detroit, Mich.
National Broach & Machine Co., Detroit, Mich.

Gear Tooth Burring Machines
Cross Gear & Machine Co., Detroit, Mich.

Gears—Cut
Baush Machine Tool Co., Springfield, Mass.
Cone-Drive Div., Michigan Tool Co., Detroit, Mich.
Earle Gear & Machine Co., Phila.
Farrel-Birmingham Co., Inc., Buffalo, N. Y.
General Gear Co., Detroit, Mich.
Gleason Works, Rochester, N. Y.
Hartford (Conn.) Special Machinery Co., The.
Mesta Machine Co., Pittsburgh.
National-Erie Corp., Erie, Pa.
Philadelphia (Pa.) Gear Works.
Simonds Gear & Mfg. Co., Pittsburgh.
Taylor-Wilson Mfg. Co., 25 Thomson St., McKees Rocks, Pa.

Gears—Ground Teeth
Hartford (Conn.) Special Machinery Co., The.

Gears—Machine Molded
Poole Foundry & Mch. Co., Baltimore, Md.

Gears—Non-Metallic
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Philadelphia (Pa.) Gear Works.

Generator Sets—Gas & Diesel Engine Plants
Ready-Power Co., The, Detroit, Mich.

Generators—Acetylene
Air Reduction, 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

Generators—Electric
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Hobart Bros. Co., Troy, Ohio.
Reliance Electric & Engineering Co., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh.

Generators—Plating
Meaker Co., The, Chicago, Ill.

Gloves—Asbestos & Fireproof
American Optical Co., Southbridge, Mass.
Industrial Gloves Co., Danville, Ill.

Accuracy to the tenths of a thousand of an inch — and it's easy to be sure of it for you can detect the slightest touch with Davis Tubular Micrometers and Standards.

Durably constructed for lasting accuracy and to withstand a lot of handling. Available in crescent and bar types in 45 different sizes — 0" to 168" — each equipped with a sliding ground bar and micrometer head. Made by the builders of Davis High Production machines.

Write for bulletin.

DAVIS & THOMPSON CO.
Milwaukee, Wisconsin, U. S. A.

DAVIS
Tubular Micrometers
. . . made by the builders of DAVIS Continuous Milling and Drilling Machines and other High Production Machines.

Have you felt the need yet of taking on

SUB-CONTRACT DEFENSE WORK

If so, do you know where to get it?

●

The answer to this one is—run some moderate size advertisements in The Iron Age's Sub-Contracting Section which appears twice a month in the first and third issues.

The companies that are letting out sub-contract work in the metal-working industry are Iron Age subscribers in most instances.

PRODUCTS INDEX

Goggles—Safety
American Optical Co., Southbridge, Mass.

Graduating Machines—Metal
Noble & Westbrook Mfg. Co., The, E. Hartford, Conn.

Grating
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Borden Metal Products Co., Elizabeth, New Jersey.
Hendrick Mfg. Co., Carbondale, Pa.
Kerlow Steel Flooring Co., Jersey City, N. J.

Grease—See Lubricants

Grilles—Perforated Metal
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., The, Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.

Grinders—Carbide Tool
Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich.

Grinders—Cold Saw Sharpening
Atkins, E. C., & Co., 406 So. Illinois St., Indianapolis, Ind.
Motch & Merryweather Machinery Co., The, Cleveland, Ohio.

Grinders—For Lathe & Planer Tools
Gisholt Machine Co., Madison, Wis.
Sellers, William, & Co., Inc., 1620 Hamilton St., Phila., Pa.
Sundstrand Machine Tool Co., Rockford, Ill.

Grinding and Polishing Machines
Black & Decker Mfg. Co., The, Towson, Md.
Bryant Machinery & Engineering Co., Chicago.
Excelsior Tool & Mch. Co., E. St. Louis, Ill.
Norton Co., Worcester, Mass.
Vonnegut Moulder Corp., Indianapolis, Ind.

Grinding Machines—Centerless
Cincinnati (Ohio) Grinders Incorporated.

Grinding Machines—Chucking
Bryant Chucking Grinder Co., Springfield, Vt.
Landis Tool Co., Waynesboro, Pa.

Grinding Machines—Cylinder
Heald Machine Co., The, Worcester, Mass.

Grinding Machines—Cylindrical
Brown & Sharpe Mfg. Co., Providence, R. I.
Cincinnati (Ohio) Grinders Incorporated.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

Grinding Machines—Drill
Gallmeyer & Livingston Co., Grand Rapids, Mich.
Sellers, William, & Co., Inc., 1620 Hamilton St., Philadelphia, Pa.

Grinding Machines—Face
Abrasive Machine Tool Co., East Providence, R. I.

Grinding Machines—Flexible Shaft
Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.
Strand, N. A., & Co., Chicago.

Grinding Machines—Gear & Worm
Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.

Grinding Machines—Internal
Bryant Chucking Grinder Co., Springfield, Vt.
Heald Machine Co., The, Worcester, Mass.

Grinding Machines—Internal Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.

Grinding Machines—Knife & Shear Blade
Harris-Seybold-Potter Co., Dayton, Ohio.

Grinding Machines — Portable Electric
Black & Decker Mfg. Co., The, Towson, Md.
Chicago (Ill.) Wheel & Mfg. Co., 1101 W. Monroe St.
Millers Falls Co., Greenfield, Mass.
Rotor Tool Co., The, Cleveland, Ohio.

Grinding Machines—Portable Pneumatic
Rotor Tool Co., The, Cleveland, Ohio.

Grinding Machines—Roll
Cincinnati (Ohio) Grinders Incorporated.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Landis Tool Co., Waynesboro, Pa.

Grinding Machines—Rotary Surface
Heald Machine Co., The, Worcester, Mass.

Grinding Machines—Surface
Abrasive Machine Tool Co., E. Prov., R. I.
Blanchard Machine Co., Cambridge, Mass.
Gallmeyer & Livingston Co., Grand Rapids, Mich.
Heald Machine Co., The, Worcester, Mass.
Hill Acme Co., The, Cleveland, Ohio.
Mattison Machine Works, Rockford, Ill.
Norton Co., Worcester, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.

Grinding Machines—Swing Frame
Black & Decker Mfg. Co., The, Towson, Md.
Shuster, F. B., Co., The, New Haven.
Vonnegut Moulder Corp., Indianapolis, Ind.

Grinding Machines—Tap
Gallmeyer & Livingston Co., Grand Rapids, Mich.
Jones & Lamson Machine Co., Springfield, Vt.

Grinding Machines—Thread
Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich.
Jones & Lamson Machine Co., Springfield, Vt.
Landis Machine Co., Waynesboro, Pa.

Grinding Machines—Universal Cutter
Cincinnati (Ohio) Milling Mch. Co., The.
Continental Machines, Inc., 1311 S. Washington Ave., Minneapolis, Minn.
Gallmeyer & Livingston Co., Grand Rapids, Mich.
General Machinery Corp., Boston, Mass.
Landis Tool Co., Waynesboro, Pa.
LeBlond, R. K., Machine Tool Co., Cincinnati.
Norton Co., Worcester, Mass.

Grinding Wheels
Abrasive Co., Philadelphia, Pa.
Bay State Abrasive Products Co., Westboro, Mass.
Blanchard Machine Co., Cambridge, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Chicago (Ill.) Wheel & Mfg. Co., 1101 W. Monroe St.
Macklin Company, Jackson, Mich.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Towsend St. Passaic, N. J.
Norton Co., Worcester, Mass.

Grinding Wheels—Mounted, Pencil
Bay State Abrasive Products Co., Westboro, Mass.
Chicago (Ill.) Wheel & Mfg. Co., 1101 W. Monroe St.
Norton Co., Worcester, Mass.

Grinding Wheels—Segment
Abrasive Co., Philadelphia, Pa.
Blanchard Machine Co., Cambridge, Mass.

Hammers—Air, Forging
Chambersburg (Pa.) Engineering Co.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Lobdell Car Wheel Co., Nazel Hammer Div., Wilmington, Del.

Hammers—Chipping & Riveting
Black & Decker Mfg. Co., The, Towson, Md.

Hammers—Drop
Ajax Mfg. Co., The, Cleveland.
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.

Hammers—Helve
Bradley, C. C., & Son, Inc., Syracuse, N. Y.

Hammers—Machinists'
Usheo Mfg. Co., Inc., 135 Tonawanda St., Buffalo, N. Y.

Hammers—Steam
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.

Hangers—Shaft
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., The, New Britain, Conn.
Hyatt Bearings Div. General Motors Sales Corp., Harrison, N. J.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Triangle Mfg. Co., Oshkosh, Wis.

Hardening Machines—Electric Induction
Ohio Crankshaft Co., The, Cleveland, Ohio.

Heading Machines
Ajax Mfg. Co., The, Cleveland, Ohio.
Hill Acme Co., The, Cleveland, Ohio.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

Heads—Spun and Pressed
Worth Steel Co., Claymont, Del.

HERE'S GOOD NEWS for manufacturers who are planning ahead today for strongest possible economic positions after the present emergency.

Right now U.S.A. defense requirements are taking all the PARLON that can be produced—and preference rating certificates must be attached to purchase orders to manufacturers of PARLON-fortified enamels.

But you *can* get all the facts now, and have your finishing procedures planned in advance for a quick change-over to PARLON-fortified enamels when the emergency is over. Then you will not only cut your drying time in half (with or without ovens), but your products will have tougher, more resistant synthetic finishes than ever before. PARLON-fortified enamels are not alone *tough*; they are beautiful, lustrous, in a wide range of colors.

Write for full information.

PARLON

★ ★ ★ ★ ★ ★ ★ ★

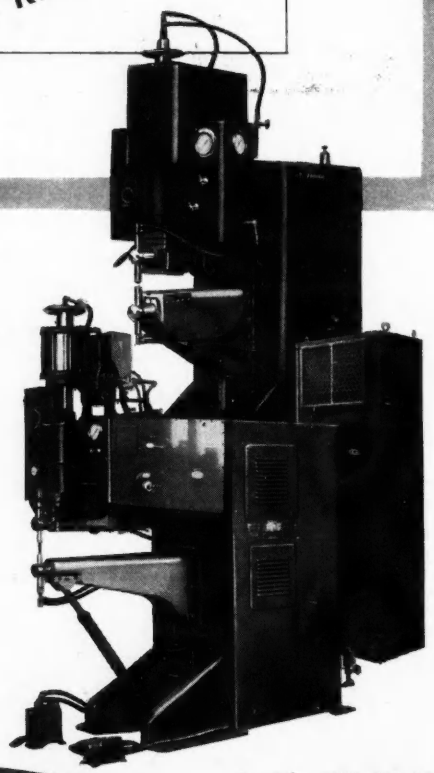
CELLULOSE PRODUCTS DEPARTMENT
HERCULES POWDER COMPANY
INCORPORATED
934 MARKET STREET • WILMINGTON • DELAWARE
GGG-37

ALWAYS CONSIDER RESISTANCE WELDING

DEFENSE INDUSTRIES

GEARED TO MEET DOUBLE DEMAND

COMMERCIAL RESEARCH



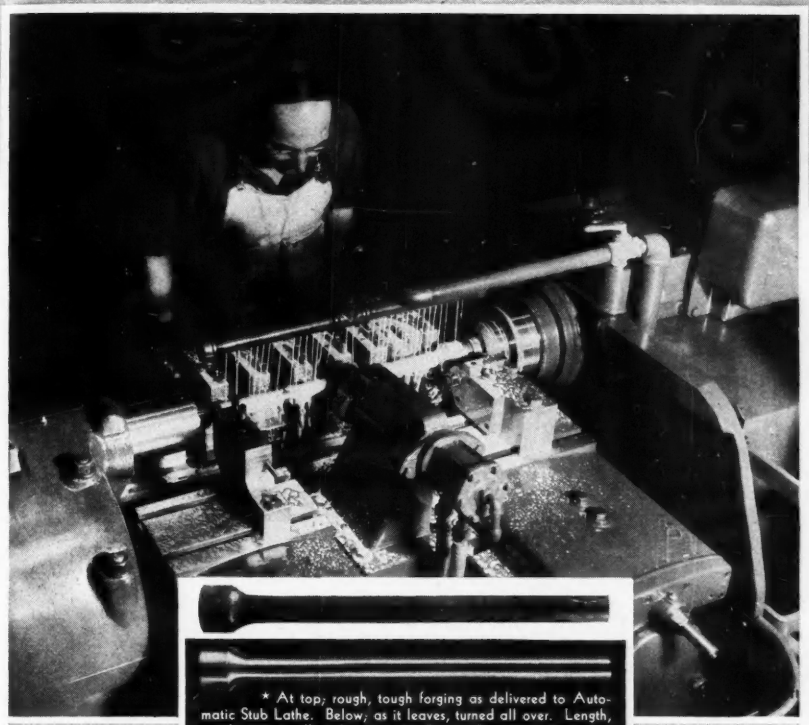
INCREASED engineering and production facilities enable Federal to handle National Defense orders and maintain commercial research. Federal production is geared to meet service demands . . . whether it's a newly developed Uni-Pulse Roller Spot Welder used by the aircraft industry, or rugged, modernly designed, conventional machines for commercial applications. If you have a metal fabricating problem, consider resistance welding. There is a standard or special Federal machine to do the job.

Send for UNI-PULSE Technical Bulletin 527

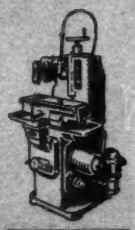
THE Federal MACHINE AND WELDER COMPANY WARREN, OHIO

SALES OFFICES IN ALL PRINCIPAL CITIES

Engineered Productio



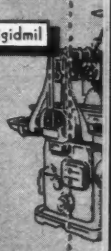
* At top, rough, tough forging as delivered to Automatic Stub Lathe. Below, as it leaves, turned all over. Length, nearly 21"; smallest diameter, 1"; floor-to-floor time, 4 minutes.

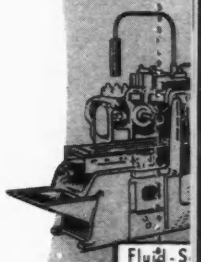


No. 00 Rigidmil

No. 0 Rigid

No. 1 Rigidmil





Fluid-S Rigidr

Like An Angleworm On Centers!

A Tough Job . . . Assembled in their bearings, the tough slender shafts shown above are "stout fellas". Between lathe centers they tend to wriggle like angleworms, which makes accurate turning quite a trick. Formerly, turning these shafts required two operations, two handlings, two machines, two operators. Straightening followed, and extra grinding on bearing surfaces. Rejects were numerous.

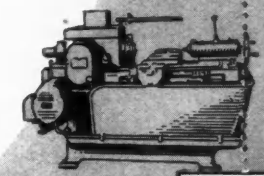
Sundstrand Does It . . . Now these shafts are turned complete on one machine, with one handling by one operator who does other work also. Straightening is unnecessary, grinding reduced, rejects practically eliminated. Sundstrand Engineered Production did the trick by equipping a Model 10 Automatic Stub Lathe for this job.

Here Is How . . . Nine tools work on this part, but first one of them turns a seat for a roller steady-rest which moves in automatically. Shaft is now turned all over in four minutes floor-to-floor. Engineered Production experience and Automatic Stub Lathe adaptability is the winning combination on this job, as it is on thousands of others.

★ Automatic Stub Lathes and Rigidmils are booked ahead, but Sundstrand Engineered Production is available to develop most effective applications and tooling for future deliveries as they become available. Write us now about your prospective requirements on manufacturing turning and milling.

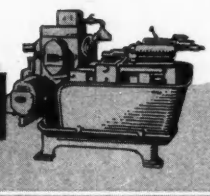
Bulletin Tells All

Booklet shown above tells all about Automatic Stub Lathe advantages, cycles, specifications. Write for your copy, today. Ask for Bulletin 391.

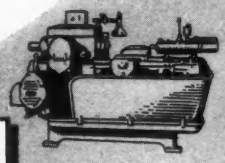


Model 12 Automatic Stub Lathe

Sundstrand Machine Tool Co.
2539 Eleventh Street, Rockford, Illinois, U. S. A.



Model 8 Automatic Stub Lathe



Model 10 Automatic Stub Lathe

In their respect fields, Sundstra machine tools a unexcelled for his production, accu racy, and lasting value. Write for complete details.

SUNDSTRAND MACHINE TOOL CO. ROCKFORD ILLINOIS U.S.A.

RIGIDMILS · STUB LATHES

Hydraulic Operating Equipment — Drilling and Centering Machines

THERE IS MORE THAN ONE ROAD TO MARKET

PARKER PROCESSES are substituting for strategic metals

There is always more than one way to do almost any job, and thousands of manufacturers are developing new methods—finding new materials—solving new problems. When defense requirements create difficult conditions in their finishing departments, they take a new road—it may be better—and shorter.

Parker Processes are taking the places of strategic metals. In scores of cases they are substituting for zinc, tin, cadmium and chromium. They provide ample protection and fine appearance—at comparable costs. If finishing for appearance, for rust-prevention, or reducing wear on friction parts, Parker Processes are proven "roads" to your destination.

If you have not investigated Parker Processes recently, send for new books fully describing them.

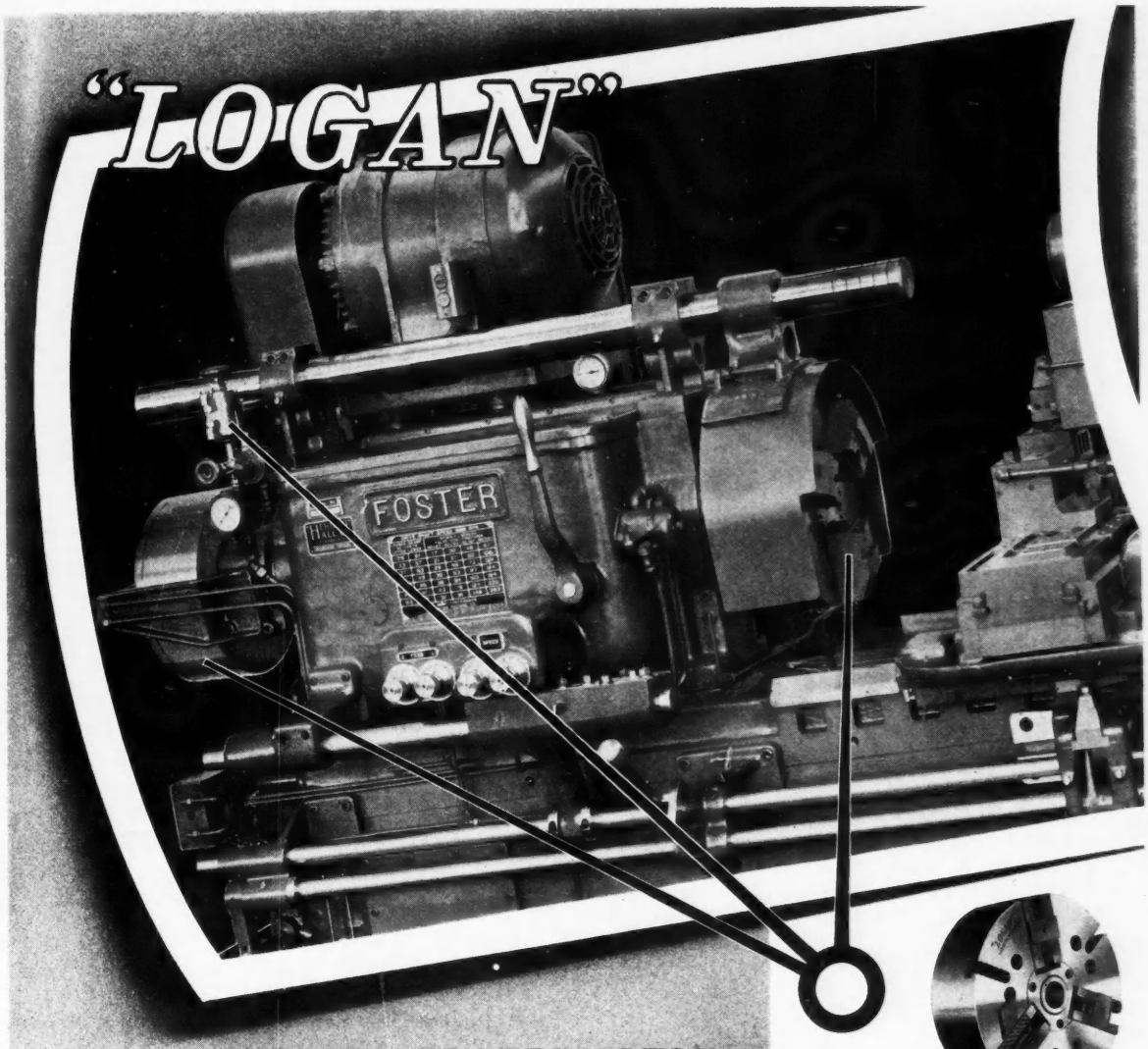
PARKER RUST PROOF COMPANY
2186 E. Milwaukee Ave. • Detroit, Michigan

PARKERIZING
A finish and substantial protection from rust on bolts, screws and small mechanical parts.

BONDERIZING
A rust inhibiting paint base that bonds the finish to sheet metal surfaces.

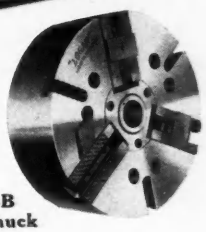
PARCO LUBRIZING
A chemically produced coating for friction surfaces that retains oil and prevents metal to metal contact.

PARKER *Processes* **CONQUER RUST**
BONDERIZING · PARKERIZING · PARCO LUBRIZING

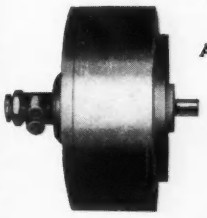


FOSTER FASTERMATIC with "LOGAN" AIR EQUIPMENT

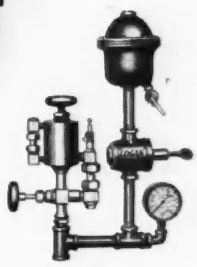
This new Foster platen type Fastermatic lathe is equipped with "LOGAN" Three Jaw Chuck and a Model "R" Rotating Type "LOGAN" Air Cylinder and Accessories. "LOGAN" Air Cylinders are designed to supply power efficiently and economically to all types of chucks and holding devices. "LOGAN" Chucks combine extra strength and rigidity with extreme compactness and light weight. "LOGAN" Representatives and "LOGAN" Engineers will be glad to make recommendations on your chucking problems.



Model 350-B "LOGAN" Chuck



"LOGAN" Model R Air Cylinder



"LOGAN" Reducing Valve, Air Filter, Gauge and Lubricator Unit.

LOGANSPORT MACHINE, INCORPORATED

914 Payson Road — Logansport, Indiana

Manufacturers of Air and Hydraulic Devices, Chucks, Cylinders, Valves, Presses and Accessories

experiences of every sudden turn of human life, stun and break some people but enlighten and harden others." Far from being broken by our experiences, and whatever the condition of our national fortunes has been, one of the most significant features of this war is that the nation, without any external stimulus, and urged only by a supreme and dogged confidence in the outcome, has set itself to examine and discuss every kind of political, social, and industrial aspect of our affairs, and no section of the industrial world has been more active in these matters than the members of our own Industry. Into these discussions was interjected eighteen months ago the welcome news that the Government had decided to assemble all the fuel industries into one Department of the Board of Trade, and to appoint Dr. E. W. Smith to be Director-General of the Gas Division. Later, as you are aware, the Government further developed its plans by establishing what many of us have constantly hoped for during the past 25 years —a Ministry of Fuel and Power, with Dr. Smith as Director of the Gas Division. This decision was again warmly welcomed by the Gas Industry, and indeed by the whole country, as giving a clear indication that the Government looked upon fuel as one problem, complicated unfortunately by the necessity of importing a large percentage of our liquid fuel requirements.

There is no shadow of doubt that, having regard to this gap in the nation's fuel resources, and to our abundant supply of excellent coal, the establishment of this Ministry has been delayed far too long. Far too long we and others who have studied this highly complex material, coal, have urged that it was much too valuable to be used as a raw fuel, to darken our skies and foul our cities and countryside with smoke and smuts. Further, we have seen millions of tons of it exported every year, to be carbonized and stripped of its valuable by-products, and every encouragement given by Government and colliery companies for the development of this trade. In fact, there have been numerous occasions when first-class gas and coking coal was being received on the Continent at a price lower than it could be bought in London. Surely if coal is to be processed it should be done in this country. May I give you a simple analogy the truth of which is well known to most of you? Up to 45 years ago enormous numbers of live cattle were imported annually into this country from North and South America, and slaughtered in large abattoirs at Liverpool, Deptford, and elsewhere. The development of refrigeration and the chilling process, however, gave exporters an opportunity they were not slow to seize. The cattle were killed abroad and processed, the carcasses only coming to us, leaving behind valuable by-products—hides, horns, hoofs, fats, hair and offals—which have formed the basic raw materials for great industries which now supply their finished products to this country. As far as possible we should endeavour to apply the same principle to our coal, and not send it abroad to be stripped and so provide materials for competition with our own industries.

As an Industry, therefore, we have heartily welcomed the establishment of the Ministry of Fuel, and I certainly hope that as soon as possible the Minister will appoint a commission of impartial people—technicians, industrialists, and those concerned with the domestic life of the people—to enquire thoroughly into the spheres and potentialities of each fuel, for it is an urgent economic necessity that we should make the best use of our coal. We shall have no anxiety about the result of such an Inquiry.

It gives us all great pleasure to welcome here to-day one of our members as President of the Institution. Mr. E. V. Evans for many years has devoted himself with great enthusiasm to the close study of the processing of coal, and has made this the principal theme of his year of office. I have no doubt he will use all the influence which that office confers on him to urge upon the Minister the views he so strongly holds. Our Industry serves the country in a two-fold capacity —it carbonizes nearly 20 million tons of coal every year, stripping it thereby of its valuable by-products to provide raw materials for many other industries, and giving back to the nation 10 cwt. of smokeless fuel and 75/80 therms of gas for every ton of coal it uses. In short, we as engineers are carrying out the first duty of our profession in converting for the use of man one of the great sources of power in nature, and, what is most important, performing this service with the maximum of economy.

Research

We also welcome the President as Chairman of the Gas Research Board, which among other things is trying to solve the extremely difficult problem of placing on a practical and economic basis the complete gasification of coal. As an advocate of this from my earliest days in the Industry, may I on your behalf offer to him and to the Board our best wishes for the success of their work? The Board has not been long in existence, and no doubt the limited funds placed at its disposal, and now the limitations imposed by the war, have restricted its work; but I hope it will go ahead with renewed vigour after the war, for in addition to complete gasification many other problems remain to be solved. Large sums of money have been spent on investigation and research work by many of the big gas undertakings and by makers of gas apparatus and appliances, but as far as possible this work should be co-ordinated and given central direction. Private enterprise will always demand and should receive support for a considerable amount of freedom, but in working from first principles much waste can be avoided by co-operation in which the interests of all are served.

Competition

No doubt you all read in the Press a few days ago the account of Major Lloyd George's call to us and to the electricity industry that we should cease the internecine struggle which has existed between us for so many years. As the Minister truly said, "the two are complementary to each other," and every sensible gas engineer agrees that this is so. It has been my privilege during the war on various joint committees to meet and work with a number of the leading electrical engineers, and I have never heard from them any views differing from this. It is only when the propagandists of big finance get to work, or the enthusiastic imagination of the Women's Electrical Development Association runs riot, that we really get annoyed with our friends on the other side.

I dislike very much suggesting any similarity between some of this propaganda and that which was recently so common among our enemies when speaking of "the decadent British people"; but it has an unhappy resemblance to their claim that the future belongs to the young nations. This kind of thing, as the Minister warned us, should be stopped. There are vast untapped fields of development awaiting both of us in the industrial and domestic affairs of the nation, and we should cease this waste of time and money in a struggle which should not be tolerated in the twentieth century. Much as one recognizes the tonic effect of competition, this does not excuse the waste of large sums of money which in the end have to be provided by the people of this country.

Post-War Planning

Meanwhile, we have to put out own house in order, so that we may acquit ourselves creditably in the post-war world. It has become abundantly clear to thoughtful people that in some respects the organization of the Industry is not such as will enable it to meet effectively all the developments which may take place. The British Gas Industry, like so many of our industries, grew up as individual independent units in an individualistic world, and we must be prepared, like other industries, to move with the times, and submit ourselves to schemes of rationalization and combination which are an essential part of modern economics. I think it is generally agreed that this is absolutely necessary, and Dr. E. W. Smith has performed a most useful service in pointing out some of the directions in which we are lacking, and in fixing our attention on the construction of a new and better organization. It is a matter of great regret to us that we have to go forward without his official assistance, and his resignation has caused widespread regret. I am sure he would prefer that I should not say more about this matter, but I know I am voicing your wishes in extending to Dr. Smith our sincere sympathy that the work which obviously he was enjoying, and had so much at heart, is not to be continued by him, and to express the hope that he will still give the Industry the benefit of his counsel and assistance.

Many thoughtful Papers and constructive criticisms of the present organization of the Industry, together with proposals for the future, have also been put forward during the past two years. It is not my purpose to add to these, except to suggest that the problem is a difficult and intricate one and cannot be lightly undertaken. As you are aware, a Post-War Planning Committee was appointed 18 months ago to enquire into this and other matters which may require to be taken in hand either now or after the war. This Committee has met frequently and appointed a number of special Committees to deal with sections of its task. I shall endeavour not to contravene the dictum of Aristotle "that we shall be wise to eschew those matters in which our counsel might fail to be authoritative," but I cannot help thinking that if we are to proceed with as little delay and friction as possible the Post-War Planning Committee, in this question of Reorganization of the Industry, should confine itself to collecting factual evidence, and then suggest an outline scheme founded on what appears to emerge from the facts.

We are told that other Industries, notably steel and cotton, have reorganized themselves internally, but I need not point out how very much they differ in control and responsibility from our own. It seems inevitable, and in fact desirable, that there will have to be some form of Government control, and even compulsion, for any voluntary scheme may be ruined or seriously weakened by abstentions. This country, however, has grown great on individual enterprise, and regimentation has either been resisted or stultified us as a people. We shall be wise, therefore, to exercise great care in this matter of inviting control from Whitehall, and take what precautions we can to see that reorganization will yield the maximum of assistance with a minimum of interference compatible with efficiency and service to the consumer; for this must be the only criterion on which any scheme should be judged. In the end it is inevitable that the Government will have to decide what is to be done, but I think we have all been impressed so far that the Minister wishes to be friendly and helpful. I hope, therefore, it will be possible for an impartial enquiry to be held by a committee on which all interests concerned are represented, and before which all the interests affected will be heard. If this is done, I sincerely

hope the Industry will loyally accept any decision which may be reached.

Education

I cannot conclude my Address to you without referring briefly to education—to me a subject of the greatest importance. My predecessor in the Chair also referred to it last year and there has been some progress since then, for there is now a prospect that, after a suitable interval when peace is declared, the Institution will require from those seeking admission a certain standard of technical and educational qualifications, comparable with that required by other scientific institutions. This is all to the good, for the Industry can only flourish if its technical control is in the hands of well qualified men.

It is, however, in the wider sphere of education I would urge that serious attention is required. In my view the vast sums of money spent on education in this country yield a poor return as an investment. Why is it that so frequently we hear complaints about the young men who come straight from school into factory, workshop or office? And yet after a military training these youths make magnificent soldiers, sailors, and airmen; their discipline and devotion to duty, to their country, and their fellows have never been surpassed in the world's history. Surely there is something wrong with a system which is supposed to fit these youths equally well for civil life, but which apparently fails so frequently in its results.

I am not concerned here with political systems, and it may be that, as a result of the war, Russia in such matters will learn as much or more from us as we may learn from them; but *we* have *much* to learn from them about the training and education of young people, for I am convinced we are not treating ours—boys or girls—fairly. Religious teaching has become a diminishing factor in their lives, and we have not replaced it by any other ethical training—we have no longer a code or ideals to which young minds are directed. A great Englishman has said, "You do not educate a man by telling him what he knows not, but by making him what he was not." Our education is largely a mechanized affair, consisting of packing heads with facts, while little attention is given to real education and the formation of character—to teaching young people to think tidily and express themselves accurately; to realize their duty to parents, to their fellows, to the State, and, when they go to work, to their employers; all these things are left to chance and environment, or to such movements as the Boy Scouts.

If there is one important post-war problem to which we should devote ourselves, not only as members of our own Industry, but as citizens of a great country, it is in my opinion our incomplete system of education. No nation can continue to flourish unless its people have ideals as well as being equipped to earn their daily bread. The future, however, is full of promise. This country has never stood higher in the estimation of the world, and we have a great leader, whom we all hope will be spared to guide the nation in dealing with the many difficult problems of the post-war world.

RADIATION LIMITED

The Annual General Meeting of Radiation Limited was held on March 31 at the Incorporated Accountants' Hall, Victoria Embankment, London, W.C.

Mr. J. F. DAVIES (the Chairman), who presided, said:

Dealing first with the annual accounts, the balance sheet and the profit and loss account of Radiation Limited are in the usual form, but this year your Board regret it is not possible to include the statement of combined assets and liabilities of the Subsidiary Companies. The reason is that the Subsidiary Companies are unable to complete their annual accounts for 1942 because final terms have not been settled in respect of contracts representing a substantial part of their trading. Future accounts, however, will include a statement showing the combined figures of the Subsidiary Companies.

You will see from the Radiation profit and loss account that the gross income from Subsidiary Companies for the year is £290,078, an increase of £30,798. After deducting income-tax, but including transfer fees and bank interest, the net income for the year is £145,913, so that adding the balance brought forward from the previous year, there is a total of £293,627 to the credit of profit and loss account. In view of the probability of having to meet considerable expenditure in the immediate post-war period in turning over to our normal production, it has been thought advisable to allocate £20,000 from this year's profits to general reserve, and, after providing that amount and the interim dividend on the preference stock, there remains available a balance of 257,314, which appears in the balance sheet.

It is proposed to pay the final dividend on the 6% preference stock, and a dividend of 8% on the ordinary stock for the year. These dividends, less income-tax, will absorb £106,815, leaving a balance of £150,499 to be carried forward to the credit of profit and loss account. This is an increase of £2,785 compared with the balance carried forward a year ago.

The proposed dividend of 8% on the ordinary stock compares with 6% declared a year ago. Although it has not been possible to prepare accounts of the Subsidiary Companies for the year, your Directors have carefully reviewed the position and have decided they are justified in recommending the payment of the increased dividend on the ordinary stock.

On the assets side of the balance sheet the chief items are: £2,392,675, the cost to Radiation of the whole of the shares in the Subsidiary Companies, and £1,385,613, the amount due to Radiation by those Companies. The latter item includes the dividends for the year 1942 declared by the Subsidiary Companies, the balance of their dividends for past years, and charges paid in the first instance by Radiation on behalf of those Companies.

I do not think it necessary to refer to the other items in the Radiation balance sheet, except to point out that the general reserve now stands at £260,000 as a result of the transfer this year of £20,000 to that account.

In the absence of completed accounts from our Subsidiary Companies, it is obviously impossible for me to make the usual detailed comment which has always been given to our stockholders, and I cannot say more than that on the whole your Directors regard the results of the year 1942, so far as they can at present be estimated, as reasonably satisfactory, and that we have been able to maintain in all essentials the strength of our financial position. This is a subject to which your Directors attach importance in view of the uncertainties of the future and the calls which we may have to meet.

Before the present state of emergency arose, the major interests of Radiation Limited were associated with domestic gas appliances supplied to the public through the Gas Undertakings. In face of restrictions necessarily imposed on these activities, the year under review has been a period of further curtailment for such appliances, but our efforts have been engaged in other important directions, and the whole of our factories have been fully employed.

I welcome this opportunity to pay a well-earned and ready tribute to the work which has been performed by the gas undertakings of the country. The Industry can look back upon the past 3½ years with a sense of pride, and when the time comes for the story to be told, the public will have good cause to be grateful to the gas undertakings for the services they have rendered to the nation.

Apart from the contribution which, through its by-products, the Gas Industry has made to the national war effort, householders have been blessed with almost unbroken service of gas for cooking and heating, and in these days of lack of domestic help, the housewife—and the householder himself—have cause to be grateful to the gas undertakings for excellent service under difficulties which at times must have seemed wellnigh insuperable.

The Fuel Economy Campaign has achieved important results to date, but continued vigilance is needed to ensure that the economies achieved are well maintained. The Gas Industry has given a direct lead in this as much by its efficient treatment of the raw coal it uses, as by the provision of adequate supplies to Industry of fuel in a form peculiarly suited to the many exacting demands of modern production. The curtailing of domestic supplies on a voluntary basis, whilst a reversal of all pre-war policy, has been signalized by the full co-operation of the Gas Industry and the general public in a great effort to ensure that the maximum quantity of gas shall be available to essential industry.

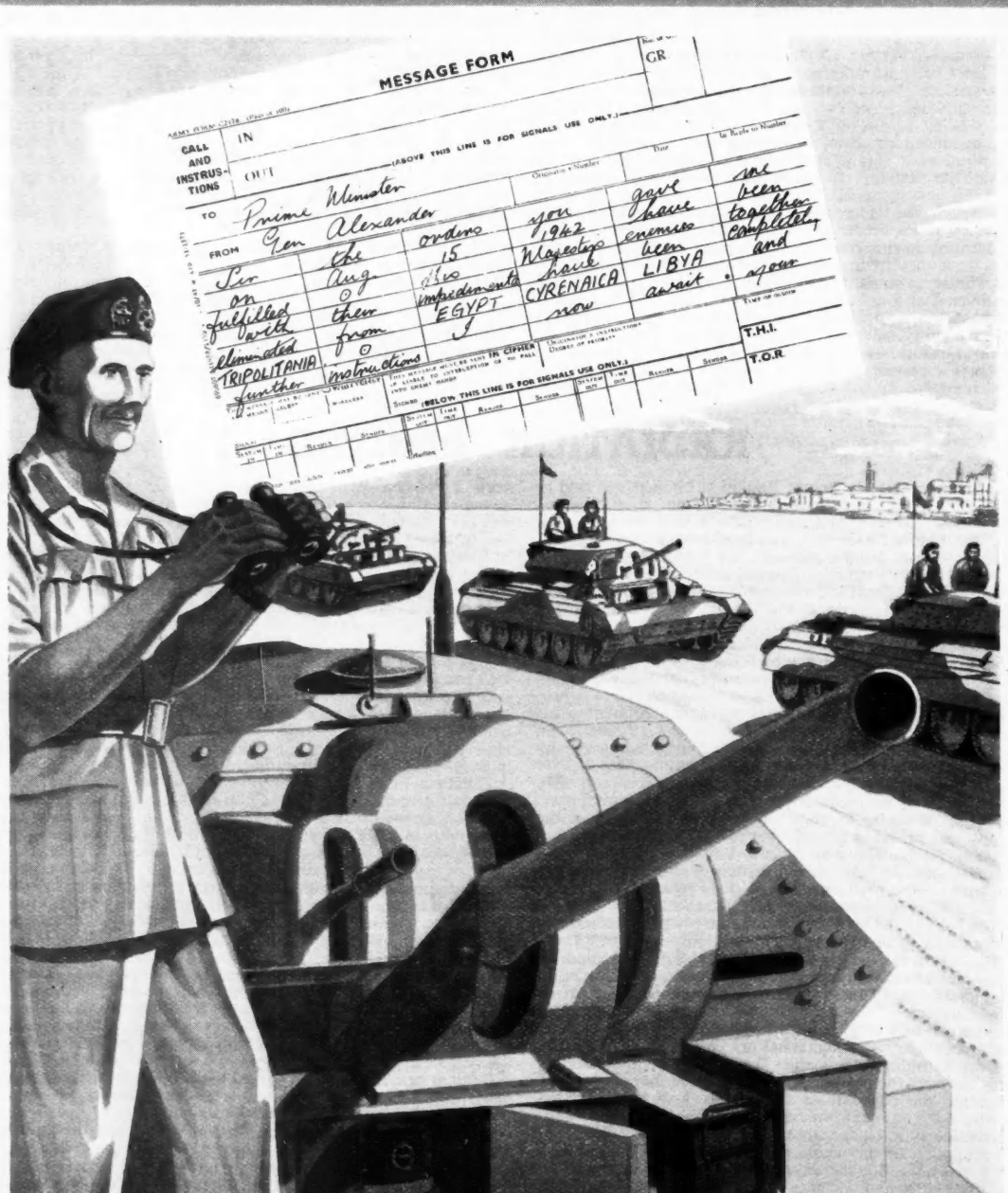
The last-mentioned aspect—domestic economy of gas—is intimately bound up with the type of gas apparatus available to the householder. An example of this is seen in the contribution made to fuel economy by the use of the "New World" gas cooker, and other Radiation specialties, which, on account of their high thermal efficiency, give the best service with the minimum of gas consumption and labour.

Radiant heat has long been recognized as the most pleasant source of warmth and comfort in domestic rooms. Pioneer research work by Radiation Limited drew attention to the beneficial properties and therapeutic value of short wave length infra-red radiation, details of which have been given in the past in our publication—"Radiant Heat and Comfort." In the post-war period we shall have available gas fires which will more than maintain the high standard of achievement already reached.

There is to-day throughout the nation a feeling of expectation and hope that in the years after this war the general standard of living, of amenity and of comfort may be raised. Whether that hope can be fulfilled is not for me to say, but so far as may lie within their power, the Gas Undertakings and the gas appliance makers will undoubtedly do all they can to help to that end.

To-day it is well recognized by all intimately concerned with the subject that the gas appliance industry has done valuable and important work in the development and improvement of appliances. Radiation Limited can look back to its own record in that respect with pride, but not—let me add—with complacency. On the contrary, we are never content, and always striving to improve, and when we can again resume our full scale of activity on that side I can say now that we shall be able to record much progress.

The Ministry of Health, and the Ministry of Works and Planning, have rendered valuable service in bringing home to the people generally a better realization of the extent to which the activities of various sections of the community must be co-ordinated, in order to ensure



Well done, the "Eighth"!

"Everywhere in Egypt is a feeling that Britain has kept her word, that we have been a faithful and unfailing ally, and that we have preserved the Nile Valley . . . from the horrors of invasion. . . . What an amazing feat this has been . . . without parallel in modern war."

Right Honourable Winston Churchill, C.H., M.P., Prime Minister, 11th February, 1943

THE PARKINSON STOVE COMPANY LTD. (STECHFORD), BIRMINGHAM, 9

that in new homes the best and wisest use shall be made of all opportunities and means for providing better standards of health and comfort.

Architects throughout the country are giving much attention to future planning, and they no doubt appreciate the help received from Government-sponsored organizations, such as the Building Research Station.

This department, for example, has been able to show the extent to which it is possible to reduce the annual fuel bill by employing materials with better insulating properties than those commonly adopted in the past.

To-day there is a greater appreciation of the need for giving first consideration in house design to the provision of the three heat services—namely, heat for cooking, for space heating, and for water heating. We have found that many of the leading architects have these matters well in mind in considering the proposals they will make to their local authorities on house design.

Everything which will contribute to economy in the home, whether in terms of money or of personal labour, is worthy of special consideration. I can but hope that, despite the urgent and pressing needs of the day, it may be found possible to make available for our own and other industries the small amount of labour required for the important work of preparation for the future.

Before I close I wish to take this opportunity of saying how greatly the Board and myself appreciate the continued efforts of the staffs and workpeople at our various works: the year 1942 was not an easy one for them—in addition to their long hours of work, they have had duties in connection with Home Guard training, A.R.P., and fire watching, and I think they have come through the year with excellent spirit.

Our best wishes go out to the employees who are serving in the various branches of His Majesty's Forces, and we hope for their safe and speedy return. Some have given their lives in the service of their country, and to the relatives of those we extend our sincere sympathy.

Tottenham and District Gas Company

The annual ordinary general meeting of the Tottenham and District Gas Company was held on March 23, at Woodall House, 658, Lordship Lane, Wood Green, London, N. 22.

Mr. Henry Woodall, the chairman, who presided, said: The notice to the proprietors convening the annual general meeting sets out clearly the limitation of the business to be conducted, namely, to declare dividends, to elect a director and auditor, and to transact general business. It will be seen also, in accordance with the Government Direction and Order, that neither accounts nor the report of the Company may be published. The accounts and report may be inspected at the office of the Company by any person entitled so to do upon giving not less than seven days' notice to this effect. I think I am entitled to say, with every satisfaction, that the dividend proposed has been fully earned, and I would also like to say that all your plant and property have been kept in an excellent state of repair.

With regard to War Damage, the promised Bill has not yet been introduced, but the Government scheme has been set out in a White Paper published in November last. Nothing conclusive is yet known, but the Company has set aside contributions to meet a probable levy.

Your directors are preparing as far as they can for the post-war period. We must not be unprepared and we are already making ready for the future. Estimates are not easy to make, but we are keeping all our plant up to date and getting material together as far as we can for renewals and extensions. Your directors have every confidence in the future. It is true there are many people who are electrically minded, and we are making it our business to see that the merits of and the necessity for gas are more fully understood. A good and abundant supply of gas is essential for the needs of the country and we are prepared and preparing to give it.

We have naturally been studying the Beveridge Report and we entirely support its principles. In this Company we have for many years attempted to do for our own people what Sir William Beveridge suggests should become a national responsibility. Our co-partnership scheme forms the basis of nearly all our efforts in welfare, including contributory pension funds, &c. In the various schemes the Company and employees co-operate and are happy to be able to do so. These joint efforts have brought the employers and employees very closely together, and have been a great factor in the success and happy working of our undertaking. It is hoped that the Beveridge proposals may be wide enough to allow us to keep our own scheme going, which has worked so well, and that we shall not lose our individuality and be absorbed in a great national scheme.

It is fitting that I should conclude with a very hearty vote of thanks to our officials, their staffs, and workmen. Some of you know the many difficulties which have been caused by the various necessary restrictions, and when you remember that in addition to doing their work adequately, practically all our men and women have additional work to do in connexion with the Home Guard, A.R.P., and Fire Watching Services, you will realize what special thanks they deserve for their work during the year. Our men are continually being called up for National Service. Many are in His Majesty's Forces at home and abroad—among them are two of your Directors, Major Edward C. Woodall and Major Charles S. Pryor, both of whom joined up just before the war started. We still keep in touch with our men wherever and whenever possible. I am sure they will be glad to know they are constantly and kindly remembered by those they have served so well. They will be very heartily welcomed when they return to their old jobs which are waiting for them. There is one class in particular I should not like to forget. As you are aware most of our coal is sea-borne, and we do very gratefully remember the gallant men who are engaged in this hazardous enterprise.

The Chairman then moved the following resolution: "That final dividends for the year ended December 31, 1942, be declared and payable on March 25, that is to say, 2½% actual on the 5% Preference Stock, 2¾% actual on the 5½% Preference Stock, and 2½% actual on the Ordinary Stock, all less Income-Tax; that the dividend warrants be sent to the proprietors by post."

The resolution was unanimously adopted. The retiring director (Mr. Arthur E. Broadberry) was re-elected, and the auditor (Lieut.-Colonel W. C. Smith, D.S.O., M.C., F.C.A.), having been reappointed, the proceedings terminated with a cordial vote of thanks to the chairman, directors and auditors, and also to the officers, staffs, and workmen for their services during the past year.

Scottish Gas Development Centre

A Scottish Gas Development Centre has been established with headquarters at the Glasgow Corporation Gas Department's Central Showrooms, 522, Sauchiehall Street, Glasgow, C. 2.

Some 80 Scottish gas undertakings have joined the Centre, which will deal with industrial and domestic matters. Mr. D. Fulton, of Helensburgh, has been appointed Chairman of the Advisory Committee to act in conjunction with the Glasgow Corporation Gas Department.

Mr. Alex. Bujnowski, M.C., Sales and Publicity Officer, Glasgow Corporation Gas Department, has been appointed Secretary of the Centre.

A Meeting of the Central Executive Board of the National Gas Council will be held at Gas Industry House on April 13, at 2.15 p.m.

A Meeting of the Central Committee of the Federation of Gas Employers will be held at Gas Industry House on April 13, at 11.30 a.m.

The Fifth Annual General Meeting of the Midland Counties Coke Association will be held at King Edward House, Birmingham, on April 29, at 2.30 p.m.

The Manchester District Association of Gas Engineers will hold their annual meeting in Manchester on April 2, when Mr. W. Fletcher will give his Presidential Address.

The Spring Meeting of the North British Association of Gas Managers will take place in Edinburgh on April 9, when Mr. R. M. Simpson will deliver his Presidential Address. An Address will also be given by Mr. E. V. Evans, President of The Institution of Gas Engineers.

The Annual General Meeting of the London and Southern District Junior Gas Association will be held on April 30 at Gas Industry House, at 6.30 p.m. At the conclusion of the business meeting an Address will be given by Mr. E. V. Evans, President of The Institution of Gas Engineers.

General Meetings of members of the National Gas Organizations in Scotland will be held as follows: April 28—Federation of Gas Employers, North British Station Hotel, Edinburgh, at 11.30 am.; National Gas Council, 2.30 p.m. May 5—British Commercial Gas Association, Central Station Hotel, Glasgow, at 2.30 p.m.

The Sessional Meeting of the Illuminating Engineering Society will be held on April 13 at the E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, W.C. 2, at 5 p.m. A Paper entitled "Photoelectric Photometers: their Characteristics, Use, and Maintenance," will be read by Mr. J. S. Preston, M.A., F.Inst.P., A.M.I.E.E. Admission by card only, which may be obtained on application to the Secretary, The Institution of Gas Engineers, 1, Grosvenor Place, S.W. 1.

Messrs. Ashworth & Parker, Ltd., Bury, inform us that Messrs. Walmsleys (Bury), Ltd., papermakers' engineers, have taken a controlling interest in their business as from Mar. 1. Messrs. F. O. L. Chorlton and W. S. Parker have retired from the Board and the vacancies thus created have been filled by the appointment of Mr. J. Wolstenholme (Chairman) and Mr. R. P. Timpany. Messrs. E. S. Hardman, Chief Engineer, and H. Sheldon, Commercial Manager and Secretary, who have been with the Company for many years, retain their seats on the Board and will be responsible for the management. The firm will continue as a separate concern and concentrate as before on the manufacture of high-speed steam engines, strainers, governors, and paper machine drives.

Gas Products Prices

The London Market Mar. 29.

All Coal Tar Products are in good demand, and Pitch in the London area remains about 45s.

The Provinces Mar. 29.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 1s. 10d., pure, 2s. 5d. (controlled by the Control of Toluene No. 2 Order, July 3, 1941, which fixes the maximum price at which this material may be sold). Naphtha and Xylol controlled by the Coal Tar, Naphtha, and Xylol Order, 1942, dated Dec. 7, 1942, and operative from Dec. 21. Carbolic acid, 60's, naphthalene, and anthracene controlled by the Coal Tar Products Prices Order S. R. & O. 2509, dated Dec. 7, 1942, and operative from Jan. 1, 1943. Filtered heavy oil (min. gr. 1,080), 7¼d. to 8d. Creosote oil has been generally controlled as to direction and price for some time past. Current value—fuel grades 5d. to 5¼d.; timber preservation and other purposes 4¾d. to 6d.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Tar Products in Scotland Mar. 27.

Market is steady, with prices unchanged. Refined tar controlled. Value is 4¼d. per gallon *ex* Works, naked. Creosote oil: Specification oil: 6½d. to 7d.; low gravity, 7¼d. to 7½d.; neutral oil, 6d. to 6½d.; hydrogenation oil, 5⅞d. per gallon; all *ex* Works in bulk. Refined cresylic acid is changing hands at 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha: 6½d. to 7d. per gallon. Solvent naphtha: Basic prices delivered in bulk, 90/160 grade 2s. 8d., and 90/190 Heavy naphtha, Unrectified, 1s. 10½d.; Rectified, 2s. 3d. per gallon. Pyridine: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

Gas Stocks and Shares

Stock markets presented a somewhat brighter appearance for the greater part of last week although towards the close the volume of business tailed off. The tone, however, remained firm. There was also a better demand for gas stocks and shares, and the effect of this can be seen in the number of appreciations in value shown in the lists below—preference and debenture issues being particularly strong features. These included a 5s. rise in Cape Town 4½% preference, business being recorded at 60s. against 49s. the previous week. Another sharp rise was that of Barnet ordinary, which closed 10 points up at 147½. South Metropolitan 6% preference continued in demand and gained a further 8 points. On the resumption of dividend payments on this stock the quotation has risen 38 points since the commencement of the year. Gas Light units maintained their previous week's level, but Newcastle units reacted slightly on the local Exchange.

The following quotations were altered during the week:

SUPPLEMENTARY LIST

Brighton 5 p.c. Deb.	117—122	+2

PROVINCIAL EXCHANGES

Blyth Ord.	108—110	—1
Bristol 5 p.c. max.	110½—112½	+½
Newcastle Units	22/6—23/—	+—/6d.

OFFICIAL LIST

Alliance & Dublin	82—87	+2
Ditto 4 p.c. Deb.	95—100	—3
Associated Gas & Water 4 p.c. Red. Cum. Pref.	19/—20/—	+—/6d.
Barnet Ord.	145—150	+10
Bournemouth max. Div.	137—142	+2
Cape Town 4½ p.c. Cum. Pref. ...	40/—60/—	+5/-
Colonial 8 p.c. Pref. (x.d.)	⅜—⅝	Mar. 22
Commercial 5 p.c. Deb.	105—110	+2
Gas Consolidation "B" Ord. ...	16/6—18/6	—/6d.
Gas Light & Coke 3½ p.c. max. ...	66—69	+1
Ditto 3½ p.c. Red. Deb.	95—98	+1
Primitiva Holdings Ord.	12/—14/—	—/6d.
South-Eastern Gas Corporation 4 p.c. Pref.	16/—18/—	+—/6
South Metropolitan Ord.	72—75	—1d.
Ditto 6 p.c. Pref.	126—131	+8
Ditto 5 p.c. Red. Deb.	103—108	+1
South Suburban Ord.	95—100	+3
Ditto 5 p.c. Pref.	103—108	+6
Wandsworth 4 p.c. Pref.	89—94	+2
Ditto 4 p.c. Deb.	98—103	+3
Watford & St. Albans Ord.	108—113	+2

TRADE CARDS

TOM CARRINGTON & CO. LTD.
Lyndon Toolworks, West Bromwich. T/N 0517 (2 lines).
"LYNDON" and "EGA-KUT"
SCREWING TOOLS;
TAPS; DIES; STOCKS AND DIES;
GROUND THREAD TAPS

HILMOR LTD.
Tube Bending Machines (Hand and Power). Tube Bending Specialists.
Temporary Offices: London Road, Knebworth, Herts. T/N Knebworth 3179.
We can supply machines for bending Gas and Steam Piping from ⅜ in. to 2 in. in the cold state.

M. B. WILD & CO. LTD.
Mechanical Engineers, Argyle Street, Birmingham 7. T/N East 0472.
CAPSTANS. BY-PRODUCTS COKE OVEN MACHINERY. ELEVATORS. CONVEYORS. WAGON TIPPLERS.

POTTERTON, THOMAS (HEATING ENGINEERS), LTD.
Buckhold Road, Wandsworth, S.W. 18. T/N Putney 2263-4-5. T/A Potterton, Put., London.
Patentees and Makers of the **"EMPIRE"** and **"EMPEROR"** and **"REX"** Automatic Gas Water Heaters.

DIAPHRAGM & GENERAL LEATHER CO. LTD.
Franklin Road, Portslade, Sussex. T/N Portslade 8418. T/A Diaphragm, Portslade.
DIAPHRAGM'S DEPENDABLE DIAPHRAGMS supplied to all parts of the World since 1847.

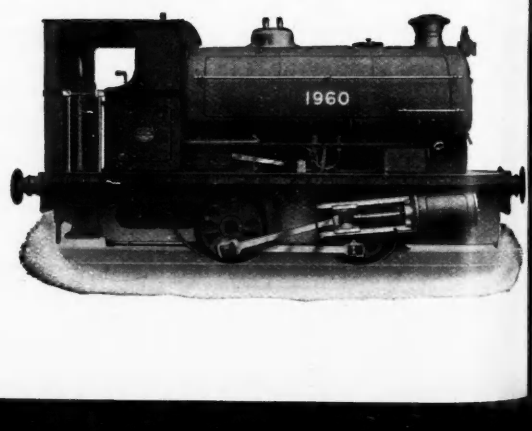
GIBBONS BROS. LTD.
Gas and Constructional Engineers, Dudley. T/N Dudley 3141. T/A Gibbons, Lower Gornal.
Carbonizing Plant, Industrial Furnaces and Heat Treatment, Constructional Steelwork, Coal and Coke Handling Plants, Storage Bunkers, Reinforced Concrete Foundations.

LOCOMOTIVES

LOCOMOTIVES of all Sizes and Gauges specially constructed for Main and Branch Lines, Contractors, Docks, Gas-Works, Collieries, Iron-Works, Brick and Cement Works, &c. Locomotives of various Sizes always in progress for early delivery.

Photographs, Specifications, and prices on Application

PECKETT & SONS, Atlas Locomotive Works, **LTD., BRISTOL.**

Telegraphic Address: "PECKETT BRISTOL."

***London Representatives:* FERGUSON & PALMER, 9, Victoria St., Westminster, S.W. 1.**